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Universities Quarterly

VOLUME 2 NUMBER 2

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Dr. E. J. Wellesz

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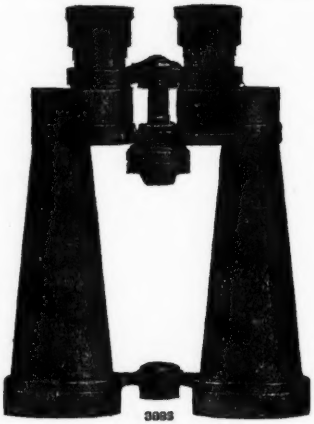

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EDITORIAL NOTES

AFTER MR. DALTON

Some operations are irreversible as the mathematicians say. We hope and believe that this applies to all that Mr. Dalton did for the universities as Chancellor of the Exchequer.

Sir John Anderson was the first Chancellor to show a real appreciation of the needs of the universities in their medical faculties; by his grant, which was on a scale previously unthought of, he enabled university medical schools to hold their own with the best in the world. Mr. Dalton followed this up by doing three things which were necessary to permit universities to do their best work. First, he gave a grant to enable the other faculties apart from medicine to be carried on and developed effectively. Secondly, he fixed the grant for a period of five years and left each university free to settle its own affairs, especially in all academic matters. Thirdly, he made the University Grants Committee responsible for seeing that the universities as a whole met the needs of the nation in teaching and research.

We have little hesitation in asserting that never has the Government of any country given its universities such liberal grants and such complete freedom in essentials combined with the necessary degree of planning on a national scale. Our universities owe a deep debt of gratitude to Mr. Dalton for the sympathy, imagination and courage he has shown in dealing with university affairs.

WHAT WILL THE CAPITAL PROGRAMME BE?

There is to be no drastic hacking at the capital programme of the universities: neither, on the other hand, are they to be given any higher place on the now narrowed ladder of building priorities. Their position is similar to that of the schools, which means that the building labour force now allocated and at work on university projects will continue for the time being at its present level of 3,000 men. Fortunately for the universities, the issue of licenses has been pressed forward faster than was at first expected, and a fair number of schemes are well under way.

At the rate at which licenses have so far been issued the universities might just have reached the £20 million mark which Mr. Dalton held out to them in March 1947. But even assuming that the economic situation gets no worse than it is now, shortages of steel and timber are likely to become more acute during the summer, and to curtail the already reduced programme. A figure of £15 million's worth of capital expenditure, or even less, may now be a more realistic estimate of the chances.

Considering how small quantitatively are the demands of the universities, it would be extremely disappointing if less than this were achieved. Meanwhile, there is everything to be said for pressing ahead with every project which can be squeezed in. The chances of completing something half done will be far greater than those for starting projects which are quite new.

A FIFTY PER CENT INCREASE

The universities deserve to be congratulated on a very fine achievement of expansion. The numbers for the current session are now seventy-six thousand, which is 53 per cent. above the pre-war figure. This is remarkable against the groundwork of shifts and shortages, on which the expansion has been built.

The full figures, shown below, which were given in the House of Commons on December 1st, reveal wide variations between the universities. The numbers at Birmingham and Durham have more than doubled. Bristol and Manchester have all but doubled, and some of the small universities or colleges have trebled their numbers. London University has only increased by 19 per cent. owing to its special difficulties, but it is astonishing to find that Oxford has increased by 50 per cent. so that it is now larger than Cambridge. The large proportion of science students at Cambridge, with the particular difficulties of laboratory accommodation, partly accounts for the different rate of expansion in the two older universities. Cambridge has expanded by 17 per cent.

It is also surprising to find that in spite of the preference for ex-service students, who are necessarily largely men, the number of women has increased proportionately more than that of men. There are now 65 per cent. more women compared with 50 per cent. more

1.—*Total Numbers of Full-Time Students Arranged under Universities*

	Academic Year 1938/39			Autumn Term 1947		
	Men	Women	Total	Men	Women	Total
Birmingham	1,013	420	1,433	2,126	839	2,975
Bristol	675	330	1,005	1,252	650	1,902
Cambridge	5,422	509	5,931	6,326	617	6,943
Durham	1,321	388	1,709	2,970	803	3,773
Exeter	288	134	422	450	335	785
Hull	126	36	162	377	188	565
Leeds	1,361	396	1,757	2,185	703	2,888
Leicester	63	19	82	297	152	449
Liverpool	1,575	480	2,055	2,196	747	2,943
London	9,705	3,486	13,191	10,918	4,871	15,789
Manchester	1,920	542	2,462	3,408	1,224	4,632
Nottingham	467	115	582	1,179	500	1,670
Oxford	4,147	876	5,023	6,375	1,125	7,500
Reading	294	290	584	520	470	990
Sheffield	619	148	767	1,327	343	1,670
Southampton	196	72	268	588	244	832
Total, England	29,192	8,241	37,433	42,504	13,811	56,315
University of Wales	2,041	738	2,779	3,440	1,214	4,654
Aberdeen	809	402	1,211	1,451	556	2,007
Edinburgh	2,358	847	3,205	3,278	1,626	4,904
Glasgow	3,580	1,110	4,690	5,644	1,429	7,073
St. Andrews (including Dundee University College)	577	351	928	1,207	608	1,811
Total, Scotland	7,324	2,710	10,034	11,576	4,219	15,795
Grand Total, Gt. Britain	38,557	11,689	50,246	57,520	19,244	76,764

II.—*Full-Time Students attending University Institutions in Great Britain*

	Academic Year 1938/39			Autumn Term 1947		
	Men	Women	Total	Men	Women	Total
Arts, including theology, fine art, law, music, commerce, economics and education	14,936	7,576	22,512	22,094	12,106	34,200
Pure Science	5,909	1,858	7,767	11,193	3,327	14,520
Medicine and dentistry	11,623	2,013	13,636	12,389	3,175	15,564
Technology, including engineering, applied chemistry, mining, metallurgy, architecture, etc.	5,199	89	5,288	9,850	293	10,143
Agriculture, including forestry, horticulture and dairy-work	890	153	1,043	1,994	343	2,337
Grand Totals	38,557	11,689	50,246	57,520	19,244	76,764

men than in 1939. In the long run a proportionately larger increase in women was to be expected, since their numbers have in the past been so much more restricted, but it appears that the catching-up process has begun already.

The most interesting figures are, however, to be found in Table II, showing the balance of numbers between the faculties. To have doubled the numbers of students studying both the pure and applied sciences is a sterling achievement in the face of the limitations of laboratories and equipment. The universities have out-Barlowed Barlow. There are naturally complaints from the science faculties that the over-crowding affects standards, particularly, as at Cambridge, because the undergraduate students have so little contact with the leading scientists in the university, but must be taught impersonally in large groups. But building work, which is already in progress at many universities, should soon relieve some of the physical congestion.

The numbers in the arts faculties have increased by roughly 50 per cent. from 22,000 to 34,000. Proportionately this is not so great an achievement, but quantitatively an addition of another 12,000 students in terms of extra staff, accommodation and administration is something to be proud of. Curiously enough, in spite of the different rate of growth of the arts and science faculties, the proportion of arts students to the students as a whole, has remained almost constant: in 1938-9 arts students formed 44 per cent. of the student population, and in 1947, 45 per cent. This stability is due to the fact that the numbers of medical students has increased only slightly. There appears, therefore, as yet no danger that the arts will be drowned by the sciences.

GRADUATE UNEMPLOYMENT?

Is there likely to be heavy unemployment among graduates over the next few years? This problem is now being discussed side by side with that of the need to increase the number of highly skilled scientists, technicians and administrators, which was brought into full prominence by the Barlow Report. And the discussion is likely to grow more strident when the big ex-service battalions come to the end of their courses in 1948 and 1949, and meet the inevitable frictions of finding themselves jobs.

There appear to be few fears about scientists in general: the demand seems to be unabated, although in certain sections supply may be a little out of step. But on the arts side, there is real apprehension. How far is it justified?

The difficulties in finding suitable employment are of two kinds. There may be no openings of any kind even remotely suitable for highly educated people: such a situation arises at times of acute depression, when employers are reducing staffs. This situation does not exist to-day. Or there may be a lack of adjustment among either the graduates or their possible employers about the work they can or ought to do. This situation does obtain now and is a serious danger to the development of university education.

University staffs and Appointments Departments report a regrettable rigidity in outlook among arts students, who clamour for jobs in the Civil Service or in the new international organisations, which are few and highly competitive, but decline to look at industrial or commercial openings, and spurn—this applies to women—secretarial jobs in which a graduate's broader outlook would be valuable. And the employers on their side are as much to blame in their reluctance to admit more arts graduates to their concerns.

If large numbers of arts graduates are going to emerge from the universities very soon, it is obvious that two vigorous campaigns must be launched—the first to educate the schools and universities to mould their raw material with a less violent bias towards professional and black-coated careers. The second campaign must be among industrialists to persuade them that their managerial departments need fresh blood from the universities, and it is encouraging that the Federation of British Industries are holding a conference on this subject in March. If either campaign fails, the expansion of the universities may be dangerously discredited.

THE F.B.I. AND RESEARCH

The Federation of British Industries is to be congratulated on a valuable inquiry they have recently carried out into the amount of research, both scientific and technical, which is at present being carried out by British industry in its own works and laboratories.*

* Scientific and Technical Research. F.B.I. 1/-

The results are extremely interesting and show that about £30 million a year is at present being spent privately by industrial concerns on research.

The figures given by the F.B.I. are not complete, for the information was only supplied by firms voluntarily. Nevertheless they are sufficiently representative to show the rough order of magnitude of expenditure by public and private bodies in research.

	£ million
Government Expenditure	
Defence	60
Department for Scientific and Industrial Research	3
Agriculture, Medical, Dominions and Colonies, etc.	6.6
Universities (total grants)	11
Expenditure by private firms	30
Total	110

These figures show the sharp disproportion in expenditure between research expenditure on defence and in other fields.

The figures obtained by the F.B.I. inquiry do, however, show an encouraging growth of research-mindedness in industry :—

In 1930, 422 firms were spending £1,736,000.
In 1935, 484 firms were spending £2,696,000.
In 1938, 566 firms were spending £5,442,000.
In 1945-6, 420 firms were spending £21,815,000.

On the F.B.I's assumption that in 1945-6 these 420 firms were carrying out three-quarters of the research in private industrial establishments, industry was spending about £30 million on research in 1945-6.

Judging by the demand for young scientists from the universities this expenditure is probably easily exceeded now. The Appointments Department of one civic university reports that it has three jobs in industry available for each of its science graduates.

SECONDARY SCHOOLS EXAMINATION REPORT

While discussions are going on actively between the universities and the schools, and the universities and the local examination boards,

about the proposals of the Secondary Schools Examination Council, it is difficult to predict what the outcome will be. If, however, the new examinations are to come into force in 1950, the Minister of Education must announce his decision by Easter. The universities are, therefore, being pressed to give the Minister their views very quickly. They have it in their hands to effect a profound reorientation in the curricula of schools. Will they seize the opportunity before them ?

The most remarkable silence has followed the publication of this report. It was a highly controversial document, and its unanimity was secured by a host of compromises ; its results, if accepted, could greatly alter the whole pattern of grammar school education. It might reasonably have been expected, therefore, that large numbers of teachers would rush into battle on both sides. Nothing of the sort has happened, in spite of the fact that the narrow specialisation, about which so many school and university teachers are concerned, could actually be increased under its provisions.

The responsibility of the universities, through their admission requirements, is to see that this does not happen. There will be an inevitable tendency, which the report does not admit, for the external pressure of employers and the entrance requirements of the universities, to compel large numbers of boys and girls to take the external rather than the internal school examinations. The present regulations for Matriculation and Higher School Certificate will have to be redrafted if the report is accepted. Here is a magnificent opportunity for the universities to remould their regulations more on the lines of the scholarship requirements of Oxford and Cambridge, but with a still stronger emphasis on the General Papers, so that neither illiterate scientists nor scientifically ignorant arts students are admitted. General papers, moreover, as well as being a feature of the examination must, if they are to achieve their purpose, carry much more weight than they do at present.

It is also extremely important that there should be consultations between the universities in order to secure the greatest possible uniformity and interchangeability in entrance requirements, so as to avoid the present confusing and frustrating multiplicity of regulations.

HIGHER EDUCATION IN THE UNITED STATES

Mr. Marshall, the American Secretary of State, spoke as follows at the Pilgrim Dinner in London on December 12th 1947 :

" More than five million of our young people recently served abroad for a year or more, and at least three million were overseas for several years, some for longer periods. They returned to the United States with a fair knowledge of the countries in which they served, and along with that they had undergone a supreme test of themselves.

" Returning home, large numbers resumed their education, and many who had previously dropped any idea of further schooling were inspired to secure the benefits of college or university training. So we now have an extensive citizenship of young Americans of the world who early in life have had a most unusual experience and who are topping that off with an extensive education. This process gives us, I think, a new type of citizen and one whose judgment will be of immense value in the coming years with relation to the international problems of their country."

The United States Federal Education Authority announces that the 1,753 colleges and universities now have just over 2,300,000 students, as compared to 1,494,000 in 1939. The overall increase is 54 per cent. as compared to 53 per cent. in the universities of Great Britain.

The five biggest universities have expanded as follows :

	1939	1947
New York University	36,126	46,000
University of California	28,851	43,000
Columbia University	16,511	31,000
University of Minnesota	17,526	28,000
University of Illinois	14,461	26,000

It is remarkable that in spite of the much larger resources of the United States, the rate of expansion in the two countries should be so even. Nevertheless, the scale of the American experiment in mass higher education is astonishing. The standards in the two countries often differ, but it is stimulating to see so much enthusiasm for learning.

" *LITTLE-GO* "

Cambridge University may well be proud of its reputation for science and scholarship : yet it harbours certain ideas about education which are as obsolete as the science of phrenology, and which suggest

that its sister university is in danger of losing its pre-eminence as the home of lost causes. Some of the remarks made in the Senate debate on Latin as a university entrance requirement will be useful to educational psychologists who wish to expose the doctrine of " formal discipline " without being accused of caricaturing it. For here, in 1947, are the old dogmas of the faculty psychologists and the phrenologists, lacking only the bumps. Collectors of such antiquities may find it convenient to have a few of them exhibited here.

One speaker " took his stand on mental discipline." The insecurity of this stance was demonstrated by Professor Sir Cyril Burt in the UNIVERSITIES QUARTERLY, Vol 1, Number 3, but it would be fruitless to repeat his argument here, since the doctrine of mental discipline is not held on rational grounds. " In childhood and early youth most education consisted in memorizing: that was inevitable because the reasoning process could not be brought into play until it had a substantial basis of factual knowledge upon which to operate." A visit to a good school would show that most education does not consist in memorizing, and any accurate record of children's play, conversation and questions[1] will demonstrate that children are capable of reasoning, even scientific reasoning, from an early age. " But it was important that the framing of the reasoning faculty should begin as early as possible. There seemed . . . to be two media only for such training at an early stage—mathematics, and a language which was inflected and syntactically strict." If these are the only media available, the outlook for education would seem to be gloomy. The situation is not so bad as it seems, however: the sort of learning needed to meet the Latin requirement could be acquired " by any intelligent adult in an hour's daily study spread over, say, six months." This seems after all a small price to pay for the acquisition of " that capability and god-like reason "which places us a little lower than the angels.

It would be inaccurate to suggest that the whole debate was on this plane of caricature. The low standard of English among students was deplored. It was claimed that " a training in Latin had a profound effect upon the writing of our own language," but the speaker did not attempt to assess the comparative value of a direct training in

[1] For example, Susan Isaacs, Intellectual Growth in Young Children. London, 1938.

English. The fear that Latin might disappear from the schools was expressed. This would indeed be a serious loss. We suggest, however, that the benefit of the study of Latin is not derived from its hypothetical power of training imaginary mental faculties, and that the cause of Latin teaching is not furthered by an examination like "Little-go." The study of Latin must stand or fall on its own merits. The more languages a student knows the better, provided he can use English well and provided he does not acquire these languages in his short school life at the expense of other studies which might be more relevant to his particular needs. Latin should be studied by as many people as possible because it is a powerful instrument of communication, the language of a great civilisation which has had very far-reaching influence, the language of an almost unsurpassed literature. If these high and just claims for it do not suffice to save it from becoming a really dead language, it is not to be saved by a six months' course of faculty-training preparatory to " Little-go."

THE BALANCE OF SUBJECTS

An analysis of the results of the Higher School Certificate for 1946 which are now available, shows how much demand for advanced education in the schools is increasing. Compared to 1939, 74% more candidates entered for this examination and 70% more passed. This brings the number of successful candidates up to 16,800 for 1946, and the number will no doubt be greater for 1947. With total university numbers up to 76,000 for the current session, this means an annual entry of something between twenty and twenty-five thousand. It is obvious that the minimum qualifying entrance examinations at matriculation level will more and more become a dead letter. And at the larger universities where the demand for entrance to some departments from those possessing a Higher School Certificate is in excess of the number of places, the Higher School Certificate is itself now a minimum requirement.

An examination of the balance between the subjects is very revealing of the current trend towards scientific studies. Between 1940 and 1946 the numbers taking English, History and Modern Languages increased by 69% and those taking Mathematics, Physics, Chemistry, Botany, Biology and Zoology by 117%. The numbers taking Classics declined

by 3%. This swing is reflected in the ratios of admissions to the universities (see page 115), which show an increase of 50% in the numbers of arts students and 100% in the number of science students.

ALLOCATION OF STATE SCHOLARSHIPS

The proposal to allocate State Scholars to different universities caused far more criticism and disturbance in its execution than did its original conception. When the scheme to increase the numbers of State Scholarships from 350 to 750 was announced last March, the complementary proposal to allocate the Scholarships among the universities and university colleges excited little criticism. It seemed that most people were in agreement with the policy of limiting the numbers of scholars going to Oxford and Cambridge, and of spreading the numbers more evenly over all the universities.

When, however, principle was converted into practice, those who were allocated to universities not of their first or second choice were naturally deeply disappointed, and the more so since the Higher School Certificate examination results are announced so unavoidably near the beginning of the university term that many individuals had difficulty in adjusting their plans.

In fairness to the authorities it must be pointed out that all the allocations have to be decided and arranged between the first week of September and the first of October; that many schools had not realized that a system of quotas was bound to restrict the number of State Scholars who could be assigned to the more popular universities; that, but for the increase in the number of scholarships, more than half of the 750 successful candidates would not have secured a State Scholarship at all, and most telling of all—that in making their own choices of candidates, neither Oxford nor Cambridge filled their quota of "allocated" places, so that no-one who won both a State Scholarship and had notified his acceptance by either of these two universities was allocated elsewhere.

Next year, when the routine is more familiar, there will, in all probability, be fewer complaints. And if the Report of the Secondary Schools Examinations Council is accepted, the Scholarship examinations will be held earlier in the year, and most of the difficulties of the present timetable will be avoided.

MODERN LANGUAGES AS AN HONOURS SCHOOL *

By Ronald Peacock

Henry Simon, Professor of German Language and Literature at the University of Manchester.

The central problem of modern languages as the subject of an honours school in universities is that their content is determined largely by other 'subjects' and not by themselves. A modern language, as a technique of communication, is undoubtedly an element in a liberal education; but it does not provide in itself material for a specialized branch of scholarship, like linguistics, or literature, or history, or philology. It remains an instrument, and takes its place alongside native English as an avenue to ideas and literature. Training in languages can of course produce a technical specialist, the intellectually amorphous interpreter. But for the specialised training of an honours school a language must ally itself with another subject; and modern language scholars have to admit that that other subject is, from the point of view of thought, primary. It determines the ideas and the methods pursued, the language being no more than a conditioning factor. The study of French literature or history is the study of literature in the conditions of French language, of history within the limitations of a national group.

This self-evident fact has never been explicitly recognised by modern language schools, because the manner in which they developed made it unnecessary at first to think about it. The subject came to be taught in the same way as a native 'language and literature.' English in England, French in France, German in Germany, provided the assumptions and conception of the subject; and since the first scholars were brought over from the Continent they stuck to their habits and no one questioned the position. In practice, therefore, modern languages have always been taught in alliance with literature, or philology, but in a way that involved isolation in the one foreign tradition and medium. There can be little doubt that history of language came off best under this arrangement; modern languages

* We hope to have further articles discussing the somewhat revolutionary proposals in this article from different points of view.

in most places became extremely philological in their aims. Unfortunately this scheme of things, which in itself was academically less vulnerable than some later developments, was open to criticism in one crucial respect; it assumed that modern language students coming to the university were interested enough in historical grammar to spend three years concentrating on it and accepting the most cursory and emasculated treatment of other studies like literature and history. Since this was not the case, and is still not so, the system became a tyranny, the personal interests of a tiny minority of scholars dictating a long course of study for thousands of unwilling students. A freshman in history or literature might find at the university a conception of his subject different from the one he brought from school, but at least it was still history or literature that he was given; it was the interest he had chosen and expected to pursue. A student in modern languages found himself tied to a specialism of which before he had not known the nature and which he often discovered was contrary to his tastes.

Where specialisation in a subject is concerned, no man has any right to prescribe its study to another. If you are considering ideals of general education, or even what subjects might be made contributory to a specialism, you are at liberty to say that this or that is desirable, but the direction specialisation takes is decided only by personal taste and ability. In modern languages the common ground is the language as a skill; beyond that tastes differ. The plain consequence is that the student must be allowed to choose his main field of study from linguistics, or philology, or literature, or history, or philosophy, in order to receive a training that suits him. If this choice is not freely allowed, then a coercion that cannot be justified on any grounds whatever is being exercised over minds that for various reasons are not in a position to revolt except by failing in their examinations and jeopardising their careers.

The Traditional View

With these points established, it will be useful to examine some existing arrangements and proposed reforms. The most usual syllabus is the mixed 'language and literature,' which contains fairly equal parts of language-history and literature, both medieval and

modern. The objections to it are various. It works within the limits of one language. It still implies that unjustifiable pressure is exerted on students' tastes. Above all it tries to put two specialisms on equal terms, whilst still confronted with the learning of the modern language, and in consequence falls short of genuine results in either direction. The problem varies from one language to another; it is much more acute with German than with the romance languages, because there is old high German as well as middle high German, the linguistic development goes further back and is more complex, and the student has no good start such as the student of a romance language has with his Latin. In Italian, Dante means studying an earlier phase of the language; whilst in both Italian and French major writers of great importance for later tradition fall earlier than in German. Even so, it seems to me that there would be advantage in subordinating language to literature, or vice versa, in order to allow for comparative study in other languages or literatures.

Modern Languages and the History of Culture

The ' language and literature ' scheme has been attacked vigorously from a point of view that differs radically from that here adopted. Criticism comes mainly from those who believe in the ' history of culture ' and would like to apply it to the study of foreign ' cultures ' through modern languages. This new approach purports to be a reform. The syllabus it proposes is an extension of the medieval and modern language and literature scheme to include history and institutions, social structure and changes, ' thought,' and possibly art history, the whole treated with a view to ' synthesis,' and governed by the assumption, lightly and uncritically held, that a foreign language can be an adequate unifying factor for the course.

In this scheme there are many elements of confusion, both in respect of general ideas, of the purposes and possibilities of an honours school, and of the function of language in culture and education. It is most desirable to take into account nowadays the broad historical interpretations that have emerged from the fruitful collaboration between historians of ideas and historians of social change. This is a vital contemporary interest, and most disciplines have been affected by it. But those who wish to apply it without more ado to the

structure of an honours school fail to distinguish between what is required for the foundations of critical knowledge, which is the business of an honours course, and the fruits of the most complex and mature scholarship. A ' synthesis ' is not achieved so easily. Each of the subjects in the proposed scheme is a specialism, complex in itself as well as in its relations with other subjects. It is a great folly for modern languages, which start with a handicap, in the sense that they have to ensure linguistic competence as well as engage in a field of scholarship, to pretend to combine so many branches of inquiry in a three years' course. It is in any case a false assumption that an adequate view of French ' cultural history,' or of the ' French mind,' can be arrived at without comparative study of other cultures. If comparison is absent, moreover, this idea of a modern language course results in a focusing of French this and French that which is totally artificial ; modern language schools can be, in spirit and effect, infinitely more nationalistic than the cultures they peruse, and instead of contributing to the understanding of European humanity they hamper it. If, however, comparison is adopted, and another ' cultural history ' studied on the same lines, well, how many years of application would be needed for that ?

The most serious objection of all is that the scheme rests on a muddled view of culture, and history, and the process of transmitting culture to students. The initial misfortune is that the word culture is not used precisely. It is taken over in the first place from social anthropology, which accounts for the notion of studying the behaviour and evolution of a social group ; but the word is also allowed to function in its narrower reference to literature and the arts and other forms of refined living, which accounts for the appearance of philosophy, literature, and art generally in the scheme. The ambiguity of the word itself has been occasioned by the refinements of the modern European mind. Two things stand out. First, a remarkable unity, which lies in common traditions of religion, philosophy, literature, and art, bearing witness to a general agreement about one aspect of the conception of culture. Secondly, a considerable diversity, which lies in the history, institutions, and mental outlook of local groups, and corresponds to the other aspect of culture.

The relations here involved are extremely complex; they overflow national frontiers, and to understand them we must apply the historical view both to the separate threads and to the whole. It seems to me that the 'history of culture,' or of any single European culture, is not in the least a subject to be grappled with directly, but rather a view, an organization of knowledge, which arises from studying over a long period a number of historical phenomena, and which depends for its poise on an acute sense of the creativeness of the human mind. All achievements of the so-called cultural kind, in religion, ethics, philosophy, literature, and art, spring from a preoccupation with absolute problems; and this is still the case even though historical knowledge influences all our thinking. The questions are still: What is my faith? How ought I to act and why? Is this poem beautiful? And the answers, however weighty the influence of the past upon them, are always assertions of the present moment; they are new, and timeless in their novelty. This creativeness is what makes culture; and its clash with material forces produces the phenomenon of particular cultures. The one cannot be understood without the other. Nobody can safely study a 'history of culture' before having a grasp of what one branch of culture is, as one aspect of the study of values; it might be philosophy, or politics, or literature, or science, and so on, but it must be one of them. This is the only thing, indeed, that ensures a continuance of culture; for the history of culture, if it is merely a scholar's knowledge about the past, is a dead end. It begins in its turn to contribute to culture when it is used, and its deepest uses are not necessarily the obvious ones of political parties. The scholars and writers, moreover, who have most illumined the progress of civilization as an interaction of varied forces and activities—Burkhardt, Whitehead, Russell for example—all worked from a central discipline. They tend also to be long livers, and their wider vision is a long growth. They have never made the mistake of supposing that a knowledge of the history of culture can be picked up in three years of rapid reading or that it could be a substitute for the creative idea.

The Paradox of Language

The problem of culture is reflected in a paradox of language. Where literature, or philosophy, and so on, are concerned, it is

accidental, a seeming boundary to subjects whose unity lies outside language. We read Descartes because he is a philosopher, and Racine because he is a poet, not because they wrote French. On the other hand, a language is, as history shows, a factor that helps to make a culture—the civilization of a social group—homogeneous. It does not give unity to a collection of miscellaneous subjects; but it does reflect a certain consistency in the way a national group varies from others in its approach to the problems common to all. Literature, with some specialized enquiry into a foreign literature, is a possible honours course. So is history. But the study of the psychological consistency of a national group, in a great variety of manifestations, is a secondary and later line of thought. It depends on an extent of knowledge, and possibilities of comparison, that are quite beyond the scope of one honours course. My own conviction is that a man who has understood some French poetry or philosophy in relation to *other* poetry or philosophy knows a good deal both about French and European culture; certainly more than one who has snatched at 'synthesis' through second-hand generalizations on nationally circumscribed lines.

Alternative Courses

Let me reiterate that I am thinking always in terms of an honours school, the idea of which I take to be a training in critical knowledge, in a limited term of three years. Whether there are too many specialists at universities, what a general education should be, whether it is desirable that students should learn about 'foreign peoples', are different problems from that under review; I am seeking simply a possible honours conception for modern languages. The salient fact that emerges is that a foreign language is a subject, in the honours sense, only if it is treated as one possible centre for linguistics or history of language. As soon as you bring in literature, or philosophy, or history, you shift to other subjects. The only sane thing to do is to accept the situation and apply the simple device of alternatives; and bearing in mind that the student is still in process of learning the language, the limited three years require that concentration should be real. We want students of language, with special knowledge of French language; of literature, with special knowledge of French

literature; of history, with special knowledge of French history.

Once the centre is established the treatment can bear a good deal of breadth, and cognisance can be taken of related subjects and interesting overlaps. For the crucial point is always to distinguish between a mere mixing of too many subjects on a false basis, and a central subject to which others can be appropriately related. If you take your stand on literature, for example, you will seek some knowledge of literature in general, of some English literature, of your French literature in greater detail, and you will frequently use the method of parallel study; history and the history of ideas will be taken into account. Such a course might include aspects of literature in the medieval period, but it could not include the detail of historical grammar or the strict philological study of medieval texts. On the other hand it would make a course that included two foreign languages easier to arrange and follow, because the principles of method would be those of one subject, literature.

Similar ideas hold good if the choice of specialism falls on history. I think that this is the proper alternative for those who wish to link their modern languages with sociological studies. They would no doubt pay special attention to social history, institutions, the broad interpretations of 'life and thought,' and aspects of literary history might be made contributory. From such a school of 'French language and history' would proceed specialists in French affairs that public life may demand. The discipline and method would be those of history and sociology, and again the outlook would extend beyond national frontiers. For without comparison such study is pointless.

It seems to me that honours teaching in modern languages can only be genuine and consistent, and produce both students and scholars with trained minds and a characteristic intellectual culture, if we make a radical choice on the lines I have indicated. I am also convinced that with a simpler economy better results would be achieved in the technical mastery of the modern language.

AMERICAN CONTROVERSY ON THE PHILOSOPHY OF EDUCATION

By I. L. Kandel and R. A. C. Oliver

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A controversy is being waged in the United States about the philosophy of education. The controversy is not merely about philosophy in the restricted sense of the discussion of abstract questions which are remote from practical problems: the various philosophical attitudes and theories find expression in the organisation, curricula and methods of teaching of colleges and universities as well as in books, articles and broadcasts. It may interest readers of UNIVERSITIES QUARTERLY, to inquire what the argument is about, whether the issues have any significance for us in Britain, and if so why there is little controversy of a similar kind in this country.

Three Schools of Thought

There seems to be three main parties in this American dispute. As representatives of the first we may select President Hutchins of the University of Chicago and Mr. Mark Van Doren.* Their educational theory is well known through its expression in the "hundred great books" curriculum, which is followed in St. John's College. The second position is doughtily maintained by Professor Sidney Hook, of New York University, whose book *Education for Modern Man* was reviewed in the August 1947 number of UNIVERSITIES QUARTERLY. The third position is the intermediate one represented by the Harvard Report, *General Education in a Free Society*, which was discussed in an article in Volume 1, Number 2.

The beliefs of the first school of thought seem to be somewhat as follows. The essential nature of man is known and the kind of education he needs can be deduced from it. The essential nature of man is unchanging, in spite of the superficial variations of human characteristics with time and place. A pattern can be discerned in the history of mankind which assists us to understand the present and guides us in directing our future developments. The values which

* Mark Van Doren, *Liberal Education*.

men hold have a permanent and objective existence. These values are handed down to us in the great books of the past. The course of study at a college or university should lead to the understanding and adoption of these traditional absolute values and truths, which are the only reliable guides to belief and conduct.

Professor Hook* attacks this school of thought as being presumptuously traditional and authoritarian. His own beliefs may be stated as follows. Men do not exist in a vacuum but in an environment, and the relations between men and their environments can be changed. These relations vary with time and place, and the solutions of past problems are not necessarily valid for the present. Men must apply intelligence to the solution of their problems; the solutions of past problems and the traditional values are only one set of factors which have to be taken into account. The method of tackling problems should be scientific and experimental. Education should be a training in the use of this method, and there is no sole curriculum content in which it can be learned. Reliance on this method, Professor Hook maintains, is characteristic of democracy.

The Harvard Report was the work of a committee, and it is not surprising therefore that it is eclectic. It does not go so far as the Hutchins school in claiming that there is an unchanging essential nature of man, yet it seeks to find common beliefs on which educational policy may be based. It finds common grounds in a sense of heritage derived from the tradition of western civilisation, yet includes in this tradition a belief in the necessity of change. What status is assigned to values is not very clear: "Values are rooted in facts; and human ideals are somehow a part of nature" (p. 73). As there are common beliefs in the United States about men and society, it is possible to devise a curriculum which has a common core for all, yet provides for the diversity of students' needs. The college will try to make students discriminating of values though it will stop short of imposing them.

The Issues and their Consequences

Are the issues in this controversy significant? Everyone with the slightest interest in the history of ideas will recognise the questions

* "Synthesis or Eclecticism." Philosophy and Phenomenological Research, VII, 2, December, 1946, pp. 214-225.

which are in dispute. Here are the perennial conflicts—the past and the present, heritage and change, tradition and innovation, authority and reason, totalitarianism and democracy, realism and nominalism, absolutism and relativism, and most of the other isms which have been the rallying points for thought and action. Here too is the never-ending attempt to find a middle of the road, to face adventure without losing security. The choices which might be made, and the effort to avoid making them, are shown in this passage from the Harvard Report :—

" Students of antiquity and of the Middle Ages can therefore rightly affirm that decisive truths about the human mind and its relation to the world were laid hold of then, and yet agree that, when new application of these truths was made through a more scrupulous attention to fact, their whole implication and meaning were immensely enlarged. The true task of education is, therefore, so to reconcile the sense of pattern and direction deriving from heritage, with the sense of experiment and innovation deriving from science that they may exist fruitfully together, as in varying degree they have never ceased to do throughout Western history." (p. 50).

These issues are not merely of speculative interest. In the United States a theory can often be translated into practice with less inhibition from tradition and lack of means than here. The " great books " theory has created the wholly prescribed curriculum of St. John's College, and a widely propagated plan of adult education has been launched on the basis of these books. The opposite theory has been used to support the curriculum of Sarah Lawrence College, based upon the needs of individual students " for knowledge of various kinds in terms of personal and social use to which the knowledge is likely to be put," to quote President Taylor,* and " upon a new concept of liberal education in which the modern college is a place where scholars and teachers gather to meet young people and to help them increase their knowledge and experience of the liberal arts and sciences." The course of study at Harvard University has been revised, in accordance with the recommendations of the Harvard Report, to provide a prescribed core of studies with latitude for the student's

*Harold Taylor, " Philosophical Aspects of the Harvard Report." Philosophy and Phenomenological Research, VII, 2, December, 1946.

choice. It is not surprising either that a relationship has been thought to exist between these educational philosophies and policies on the one hand and political and religious attitudes on the other. Philosophy, politics, religion and education have ever been intimately related.

All Quiet on the British Front

There is not much controversy about these or other issues in the philosophy of education in this country. Perhaps this is a situation to be desired : we may be doing the right things in education without thinking about it. Or perhaps we are all agreed about our philosophy of education, so that no controversy is needed or possible. The latter however is improbable. The different points of view expressed in articles in UNIVERSITIES QUARTERLY on compulsory philology, on the teaching of philosophy and on the tutorial system, for example, probably represent differences which are in part philosophical. A recent revelation of a profound cleavage of opinion in educational philosophy is to be found in *School and Life*, the report of the Central Advisory Council for Education, as the following quotation from the chapter on " The Moral Factor " shows :—

" This chapter contains the Council's attempt to deal with an aspect of our main subject which most of us regard as vital to it, but on which there is a wide divergence of conviction. As the attempt proceeded we realised that this divergence coloured both our interpretation of history and our estimate of the present situation. . . At the same time it was felt that the Council was not justified in avoiding altogether a problem which daily confronts all those who have to do with the bringing up of children."

Since this " wide divergence of conviction" about matters vital to education exists, how can the comparative lack of discussion of such matters be accounted for ? The following explanation may be advanced. The American college is in the main providing general education, whereas the British universities are mainly interested in specialist education. Our universities act as if their function were to educate specialists for various kinds of skilled occupations, including research and scholarship. Since the way to attaining this objective is apparently so well-marked, no fundamental questions of ends and

means need obtrude themselves as they do in the American colleges. In this country these are not even academic questions in the sense of questions for university speculation and debate, although voices are being raised against the narrowness of specialisation both in schools and universities. The issues may have some academic interest for professional educationists, but their relegation to the education department of the university (as if the university as a whole were not engaged in education), removes them from minds which they might otherwise agitate. The High Master of the Manchester Grammar School, in one of the rare attempts to raise such issues,* has rightly called attention to " the danger (in) the abrogation of responsibility on the part of the universities which is implied by the creation of professorships of education," though the danger might be even more acute but for these professorships.

Whatever the explanation of our British calm, if it conceals differences about the philosophy of education we should be none the worse for a little of the keen air of debate.

* Eric James, Freedom in Education, Fortnightly, October, 1947, pp. 241.

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Projective and Analytical Geometry

By J. A. TODD, Ph.D., Lecturer in Mathematics, Cambridge University.

This book is intended for use as a textbook of geometry by students in the last two years of a University honours course, and is based in the main on lectures given to Cambridge undergraduates reading for the Preliminary Examination in Mathematics and for Part II of the Mathematical Tripos. It deals with the subject as an independent and closely-knit branch of pure mathematics, at the same time showing its close relationship to two fundamental branches of Algebra, the theory of matrices and the theory of algebraic invariants. Only those parts of the subject which are fundamental to the general theory are included, and all reference to metrical applications is omitted. While the book is intended to be read by students whose main mathematical interests lie in other fields, the theory has been developed by the author in a way equally suited to the future specialist in geometry. 289 *pages.* 25/- *net.*

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REGIONAL SOCIAL SURVEYS AT THE UNIVERSITY OF BIRMINGHAM

By P. Sargant Florence

Professor of Social Studies, University of Birmingham.

Modern English universities usually take it as part of their functions to serve the community in which they have their being. It happens that many, if not most, of these universities are situated in the capital city of the regions into which England is now divided for certain practical purposes. In consequence, surveys can be conveniently undertaken by universities, each for its own region.

The relation of the University of Birmingham to its region is a clear case in point. Birmingham was made the capital of the West Midland region for Civil Defence purposes and, when in 1941 an independent body of individuals was formed as the West Midland Group of Reconstruction and Planning, members of the University staff, including the Vice-Chancellor (Dr. Priestley), Professor Bodkin, Professor J. G. Smith and myself, were glad to accept invitations to join up.

The first major task of the group was a survey of the county on the south western frontier of the region, devoted almost entirely to Agriculture—Herefordshire. This priority was partly dictated by the growing importance of agriculture in national life, partly by the Barlow Commission's recommendation of industrial dispersion away from congested areas. If some of the industries of London or Birmingham were to be dispersed, suitable places clearly had to be found for the dispersion, and the places appearing at first sight most suitable were the relatively open spaces of the deep countryside. While Birmingham had at the last census a density of twenty persons to the acre, and the London County Council had sixty persons, Herefordshire had one a fifth of a person!

"Suitability," however, implies two things suiting one another. In the planning of industrial location the two things concerned are the particular location and the particular industry. To find a location particularly suited to industry in a rural area like Herefordshire the sieve method was employed. Areas were excluded—"sieved out"—which were particularly fertile in soil, beautiful in scenery, inaccessible, or awkward to build upon because of steepness or liability to flooding.

The remaining areas were to be deemed suitable for industrial development. Unfortunately no area survived the sieve; all of Herefordshire is either beautiful, fertile, inaccessible or awkward in site!

This result, though negative, was significant. It stressed the national importance of making a sieving survey before starting large-scale industrial development anywhere; and as far as the local Herefordshire situation went, suggested the use of the existing market towns such as Leominster or Hereford for small-scale industrial additions of suitable type. The question of the particular industries that were likely to be suitable was thus broached.

Up to this point the department of the University chiefly concerned in the survey was that of Geography, and in the persons of K. M. Buchanan, now a professor in the University of Natal, and the late A. W. McPherson, the West Midland Group were well served. Next came the turn of the Commerce Department and Mr. Clive Williams (now assisting Sir Patrick Abercrombie in his West Midland Plan) and I busied ourselves with tests to find industries suitable for dispersion from congested to rural areas. The methods we adopted were too technical to be included in the Herefordshire report, but were detailed before the Royal Statistical Society and appear in Part II, 1944 of the Statistical Journal.

The Commerce Department of the University were more hard put to it when the West Midland Group decided to turn from an agricultural county to the opposite extreme found within the Region, namely the purely industrial area covered by Birmingham and the Black Country. Under the suitably uncouth title of " Conurbation " it is hoped that this planning survey will be published by the Architectural Press in March, 1948. The main contribution of the University lies in the survey of existing industries from the standpoint of the employment they can offer and of the possibility of moving them out and thus reducing congestion. I must not anticipate the conclusions reached about *what* particular industries to move and *where* they are to be moved to; but I may say that a surprisingly high unemployment rate, well up to the Welsh record, was found in the west-centre of the Black Country during the crisis of 1931-33, and clearly some advantage would follow from diversifying this little

depressed area. In fact some of Birmingham's congested light trades might move ten or fifteen miles west to the mutual advantage of the giving and the receiving end.

Surveys of the Commerce Faculty

The contribution of the University toward regional planning was not confined to participation in the work of the West Midland Group. Two county boroughs within the region, Worcester and Wolverhampton, asked the Commerce Faculty to undertake social and industrial surveys.

The Worcester Survey has been published by John Murray under the title of "County Town" and complements the surveys of Herefordshire and the Conurbation by tackling an area midway between the purely agricultural and the purely industrial type. For the city of Worcester was found to serve and to influence a countryside with a population about equivalent to its own. One of the main interests, indeed, of *County Town* to which a separate chapter is devoted is the linking of town and countryside fruitful in providing natural amenities to town folk and urbane amenities to country folk. The English highbrow is inclined to decry and escape from urban conditions, but the significance of a word such as "urbanity" must not be missed. To the English agriculturist, farmer or labourer—and squire and landowner to boot—the county or market town is a haven of civilization. We shall not easily hold the community to work and develop the land for our food, without providing the possibility of at least a weekly escape to a well planned centre of social entertainment.

Worcester offers such possibilities, but it contains as well certain industries, one of which, glove-making, is leaving it. To plan for substitute employment and to find industries for which the City is an efficient location, considerable research was required in the characteristics of different industries. The methods and results of this research is embodied in *County Town* together with some novel diagrams presenting the problems faced and some solutions offered in siting and zoning of industries and trade.

The several contributions to the published work of the West Midland Group remain severely anonymous. Not so in *County*

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Town. Here the policy, more in line with University principles, was to state specifically the individual as well as the collective contribution of the four authors, Janet Glaisyer, Tom Brennan, Walter Ritchie and myself. In the social and industrial survey of Wolverhampton shortly to be published under the title of *Midland Town* the sole author is Mr. Tom Brennan, though the Faculty of Commerce undertook to supervise. Here some of the main points of interest are the success (or otherwise) of certain social and shopping centres in municipal housing estates developed between the wars, and the tracing of the pattern of the catchment areas of shopping centres throughout the town.

The one-class housing estates certainly raise problems as the pre-war study of Birmingham's Kingstanding estate, *Nutrition and the Size of Family* brought out. Another problem area is the overspill 'dormitory' frontier between suburb and open country, Henley-in-Arden, a case in point where the Birmingham season-ticket holder is tending to oust the native is now under University survey.

The Functions of University Surveys

Universities should not in my view set up to survey every inch of their respective regions. They should conduct pioneer work in examples of each of the different types of area—rural, industrial, rural-urban, suburban estate, dormitory and overspill, depressed or near depressed—but after that they should engage in more intensive rather than in extensive work.

As these planning surveys have progressed it has become ever clearer that more intensive knowledge is required of the sociological and psychological factors. There is much writing and talking about the neighbourhood spirit, community solidarity, and words to that effect. But there is little in the way of measuring standards and actual degrees of neighbourliness, as we have set measurable standards of overcrowding and measured up the actual housing situation in the light of standards. We do not even know whether the people of any area want to be neighbourly. In a country village they have to be, for lack of anything else to do; but are not towns often looked upon as a happy escape? Why should you mix with people merely because they are geographically next to you? Is not a grouping by

intellectual interests (only possible in large towns) more pleasant and profitable than by mere propinquity? In short, before communities are finally planned, survey teams should include psychologists, sociologists (or, if the name is preferred, social anthropologists) and possibly social philosophers. In America some of these disciplines have been conspicuously developed, and it may very well be that British universities will have to recruit temporary staff from the United States to teach research students and build up a native sociology of practical value in planning.

Surveys in preparation for the location of industry, social centres, and amenities are not the only type of social research a university can carry out in its region, and Birmingham has initiated more generalized industrial surveys. The hectic war-time experiences of Coventry industries were surveyed by Mr. Shenfield and myself, in articles in the *Review of Economic Studies* during 1944 and 1945. On a larger scale, the study of early capitalism embodied in Professor W. H. B. Court's *Rise of West Midland Industry* and the enquiries undertaken by Professor G. C. Allen for 1860 to 1927 (published in 1929 under the title of the *Industrial Development of Birmingham and the Black Country*) are being continued by Professor Gilbert Walker with the added help of the more comprehensive statistics now at our disposal, such as the Ministry of Labour's *Industrial Analysis of Insured Persons in Employment*.

A Survey's Underlying General Trends

The regional industrial survey must be interpreted with some theory of industrial organization and development, if it is not to be purely descriptive. By theory, I do not mean armchair deduction from the assumption of an economic man, but generalisations based on analysis of a wide sweep of facts inside or outside the regions. Comprehensive data are now available from the Censuses of Production, British as well as American, and it is becoming possible, for instance, to correlate and interpret the location pattern of certain industries within a region with the prevailing size of their factories. In my forthcoming book on *Investment, Location and Size of Plant* I try to explain the economics of the peculiar combination existing in the Birmingham area of small and medium-sized factories with

intense localization. In short, surveys of existing facts should lead eventually to the discovery of underlying general trends. From the academic and scientific standpoint, surveys and the survey of a whole region is not an end in itself but the means toward deeper knowledge.

When, in 1880, Thomas Huxley opened Sir Josiah Mason's Science College which was to become the nucleus of the University of Birmingham, he spoke as follows: "The prosperity of industry depends not merely upon the improvement of manufacturing processes, not merely upon the ennobling of the individual character, but upon a third condition, namely, a clear understanding of the conditions of social life on the part of both the capitalist and operative, and their agreement upon common principles of social action. They must learn that social phenomena are as much the expression of natural laws as any others; that no social arrangements can be permanent unless they harmonise with the requirements of social statics and dynamics; and that, in the nature of things, there is an arbiter whose decisions execute themselves. But this knowledge is only to be obtained by the application of the methods of investigation adopted in physical researches to the investigation of the phenomena of society."

Huxley proceeded to "confess" that he would like to see one addition made to the College—"provision for the teaching of Sociology." The University which now has a Faculty of Commerce and the Social Sciences is endeavouring not only to teach but to discover sociology. No better way appears of doing both than to conduct, and to contemplate the results of, regional social surveys.

MUSIC IN THE UNIVERSITIES

By Dr. E. J. Wellesz

Fellow of Lincoln College, Oxford, Member of the Board of the Faculty of Music in the University of Oxford. Until 1938 *Professor of History of Music at the University of Vienna.*

In Sir Thomas Elyot's "The Governor" (1531), the tutor supervising the education of a gentleman is advised to mingle the studies of his pupil with some "pleasant learning and exercises, as playing on instruments of music, which, moderately used, and without diminution of honour, that is to say without wanton countenance and dissolute gestures, is not to be contemned."

The attitude which Sir Thomas Elyot expresses had more influence on the development of music in this country than is generally acknowledged. Up to the beginning of the nineteenth century musical life was everywhere determined by the demands of a society which still held to much the same ideal. Musical activity in England always kept two aspects: it had, as the continent had, its professional musicians, but the activity of amateurs was of even greater importance. For them music was a social activity in which the tradition of the Renaissance was maintained longer than on the continent. During the Middle Ages and the Renaissance part-singing, instrumental music for private performances and the organ were in the foreground, and the part which England played in this long and glorious period was a very important one. But from about 1600 Italy took the lead in the development of two new forms, opera and symphony, in which professional singers and instrumentalists were required to show an ever increasing virtuosity. Though these new forms came to England they were not completely assimilated before the end of the nineteenth century when the "British Renaissance" in music led to the establishment of a new type of musical life in this country, by coordinating its activities with that of other countries and bridging the gap which for nearly two centuries had separated music in England from the continent.

Music in Oxford and Cambridge in the Past

The two older universities, Oxford and Cambridge, played an

important part in this development, and it is necessary to ask whether they still continue to exercise an influence on the musical life of the country, and, if not, what can be done to place them once more in a position of leadership in musical affairs.

In order to understand the place which music holds in the universities we must go back for a moment and give a short historical survey. In the Middle Ages *musica* was part of the *Quadrivium* in every university both in England and on the continent. But it had nothing to do with the practice of music: it meant reading and commenting on theoretical treatises principally the *de Institute musica* of Boetius. According to the Oxford statutes of 1431 music was studied for one year in addition to the other subjects required for the degree of Master of Arts. Doctorates in music were conferred upon eminent musicians from an early date in Oxford and Cambridge, at first without any conditions attached. From the beginning of the sixteenth century, however, candidates had to give a public performance of a Mass, and at a later date in Oxford it was stipulated that they should have previously graduated as Bachelors of Music. Cambridge only adopted this restriction in 1889.

The first attempt to establish a regular lectureship in music was made by Dr. Heather in 1626. He also endowed the University with books and musical instruments and finally founded a Chair of Music, the Professor's duty being to deliver once a term a public lecture.

Such was the framework, in both Oxford and Cambridge, in which musical activities were contained up to the middle of the nineteenth century. The services of the college chapels, and the concerts of the various musical societies gave the undergraduates of all faculties opportunities of hearing and performing good music. The most important of these were directed by the professor of music. But the study of the History of Music had practically no place in this scheme.

The appointment of Sir Frederick Ouseley to the Chair in Oxford in 1854 marked the beginning of a new era. He introduced, in 1862, examinations for the degree of Mus. Bac. and laid the basis of a syllabus which remained unchanged in Oxford up to 1918 when Sir Hugh Allen was appointed Professor. In Cambridge examinations

were introduced in 1857 but here the great development of musical studies began in 1887 when Sir Charles Stanford organised lectures on music and acoustics.

This development of the study of music in the universities coincided with the development of London as the centre of musical life in England. The energetic and devoted work of the universities had brought them into a position of prominence in English musical life and the links between the universities and the various musical institutions became increasingly strong. Following the lead of the universities the teaching of the Conservatories, the activities of the Choral Societies, and even the development of concert life in England followed a certain humanistic trend, or, we could almost say, retained something of the spirit of the amateur, in the best sense of the word.

The Role of the Amateur

This, indeed, is still the attitude of cultured people in this country. Like many points of view where art is concerned, it has two sides to it. The approach of the amateur has the advantage of enabling those who are interested in music to take an active part in performances with the result that music is kept a living part of civilisation. It has the disadvantage of leading to unskilful performances of difficult works, in which the essence of the work of art is obscured or distorted. There is no danger of this happening with choral works in this country, because the tradition of part singing is nearly everywhere of a very high order, but it does happen with orchestral compositions and with chamber music.

It is the task of the universities to encourage performances by amateurs, and here too the question arises whether the highest possible standard should be aimed at by producing only a very few works and concentrating on technical excellence, or whether as many works as possible should be performed, and wide musical experience rather than technical skill be the aim.

Sir Hugh Allen understood both sides of the problem with which he was faced in Oxford, and, when we discussed the question in 1923, he told me that he had decided that the most important thing was for undergraduates to become familiar with the largest possible number of works which they were not likely to hear elsewhere.

The Impact of New Developments—The History of Music

It will be seen from this brief survey that conditions in the universities were perfectly satisfactory up to the moment when it became necessary for English musical life to reckon with three new factors which threatened to undermine the leading position of the universities. These were: (1) the development of the study of the History of Music in Continental universities as a new arts subject, (2) the rapid expansion of concert life in England, particularly in London which, after the first World War, became one of the great international centres for music, and (3) the development of the B.B.C. as a gigantic centre for musical activities of all kinds.

Let us consider these factors one by one:

(1) Interest in the music of the past was first aroused in the middle of the nineteenth century. At first the subject was mainly pursued by amateurs, in their leisure hours. But gradually the amateur had to give way to the professional scholar who realised that for the successful pursuit of his work he needed a systematic training. It was therefore found necessary, on the continent, to bring music back to the universities. Since the Conservatories already provided the theoretical knowledge of Harmony, Counterpoint and Composition, music was introduced as a branch of learning connected with History, and was taught on the same lines as the other arts subjects, i.e., on the lines of the historical method.

From the last years of the nineteenth century onwards Chairs of the History of Music were introduced in all the leading continental universities, and an International Society for Musicology was founded whose task is to organise research and publications which need a wider basis than a single country can provide. International Congresses were organised at which England was represented only by individual scholars. American universities soon followed those of the continent in teaching the History of Music, though here, since there are no Conservatories of high standard, teaching of the Theory of Music according to the English scheme still plays a prominent part.

It would have been impossible to ignore this development on the continent and in America, and in this country the newer universities include papers on the History of Music in their examination syllabus,

and in Oxford and Cambridge new decisions show that here too the necessity of giving more time to the historical approach is recognised.

But these attempts can only be regarded as temporary measures. As yet, no provision is made, as it is, for example, in the Faculty of History, to give the student an adequate training which will enable him to proceed to advanced work, to musical paleography, to reading and commenting on the medieval theorists, and to the preparation of critical editions of the works of the past.

The main reason for this is that too much time has to be spent on the elements of musical theory. A change will only be possible when those who want to study music in the universities are better equipped with theoretical knowledge, so that they can devote their time here to work which is really of university standard.

(2) London an International Centre

The fact that London became an international centre for music means that standards of performance have risen considerably during the last twenty-five years and even more remarkably since the end of the war. Foreign conductors, orchestras, chamber music ensembles, are now frequent visitors in this country, and British musicians are visiting the continent. Amateur performances are inevitably influenced by these changes. It will not satisfy university societies to give a moderately good rendering of a classical work if, shortly before, the same work is performed in a masterly way by first-class artists. To avoid such a painful clash, student societies would be well advised to perform works which are rarely heard. They should turn to the music of the past which they can master, and so they come more and more within the sphere of the continental *Collegia Musica*, which try to put into practice the results of musicological research.

(3) The B.B.C. and the Third Programme

This brings us to the third point mentioned above, broadcasting, and especially the newly organised Third Programme whose educational value is unparalleled. Here too the university societies come into competition with performances by first class artists. But it is possible, as has been said, for amateurs to raise their standards

so that performances of old music will stand up to the comparison. But here another point arises: the B.B.C. will have to depend more and more on trained musicologists to supply them with material if they are to make the music of the past increasingly accessible to their listeners. This new development, therefore, makes it desirable for the Faculties of Music in all universities to encourage musicological research. And this is not the only case in which the trained musicologist is needed: of the vast number of musical MSS in the British libraries only a fraction have been studied, and even fewer have been published. Again, the plans of the British Council to send lecturers abroad requires a good many first rate musicologists, who will have to compete with their continental colleagues who have been trained for their job for the last forty or fifty years.

Thus there are at present excellent opportunities for the student who wants to take a university degree in music, provided that the English universities make general the curriculum which some of them have already adopted, and allow for two alternative courses of study in music, always remembering the facilities which are already available at the existing Conservatories. For those who seem to be gifted as composers and practical musicians the old course should be maintained with some modifications; for those who are interested in the history of music a new course, on the lines of the best continental method, should be instituted. Such an extension of studies in music would meet all the needs which have become so pressing with the rapid development of all musical activities in this country. The introduction of the historical side would remove the discrepancy which at present exists between England on the one hand and the Continent and America on the other. And lastly it would place English scholars on the same footing as their continental and American colleagues, and spare them much loss of valuable time and much frustration. Up to now they have all had to start as individuals, from scratch, and find their own way through all the obstacles which slowed down the progress of their work. A well planned university training will give the student a mastery over the tools which he will have to use. It will depend on his talents what he makes out of the material which he undertakes to bring out of obscurity for the use of his own time.

NOTES ON MUSIC IN THE UNIVERSITIES

By Edward J. Dent

Emeritus Professor of Music, Cambridge.

This paper is of great value in giving the views of a foreign observer who has for the last few years made his home in Oxford. Among German musicologists Dr. Wellesz is a quite exceptional figure, for he is not merely a most erudite palaeographer with a wide general knowledge of musical history, but also a sound classical scholar, a man of broad literary and artistic culture, and what is more important, a highly distinguished composer of the modern school. In Germany and Austria there is still an almost impassable gulf between the professor of *Musikwissenschaft* and the conservatoire-trained professional musician ; the one is often out of touch with live music and even deficient in artistic sense, and the other has no knowledge of music beyond the ordinary opera and concert repertory. In France there has for half a century at least been a fairly close contact between the scholar and the practician, to the great benefit of both parties.

The Place of Musicology

It must, however, be borne in mind that Dr. Wellesz, educated at the University of Vienna, spent his undergraduate years in an atmosphere totally different from that of Oxford or Cambridge ; he now knows Oxford well as a lecturer, but naturally can have no idea of what Oxford meant to Tovey as an undergraduate, or Cambridge to H. P. Allen and myself in our formative years. There are two aspects of university life generally, undergraduate education and post-graduate research. It is notorious that Oxford and Cambridge during the nineteenth century (and still more so the public at large) took comparatively little interest in research in any branch of studies; but that is no longer the case, although it is certainly true, as Dr. Wellesz says, that musicology has only just begun to be recognized officially. The very word is rather new to English academic ears, and many musicians are still frightened of it. Music is an art, they say, and not a science, but if they had had an old-fashioned classical

education they would have learned from such men as Verrall and Walter Headlam that " scholarship " in the highest sense means the combination of scientific erudition with the intuition of the artist. In musicology we need only point to the work of Dr. E. H. Fellowes on Tudor Music, secular and sacred, as an inspiring example.

Dr. Wellesz stresses the importance of historical studies in music, but musicology includes many other subjects—acoustics, aesthetics, psychology and the association of music with other branches of learning. The German example, followed by the Americans, has often led English scholars, at any rate on the literary side, to be suspicious of " research " ; too many dissertations have been written which show nothing more than ant-like industry in the accumulation of apparently useless facts with no constructive criticism. Indeed in musicology there is much documentary research, and necessary research, which can be done by unmusical people—biography, bibliography and what a learned friend of mine used to call " vidge," e.g., " to repayringe y^{e} orgynes vij$^{d.}$"

Dr. Wellesz suggests that too much time is wasted on the elements of musical theory. But no serious research on musical history can be done without an academic grounding such as is implied at least by a Mus.B. degree. Many German reprints of old music show a lamentable deficiency of real " scholarship." Perhaps Dr. Wellesz would reply with Tovey that harmony and counterpoint, etc., ought to be learned at school age, like Latin grammar, so that the freshman entering for a musical degree would be as far advanced in his work as the classical freshman in Latin prose and verse composition. If the schools can bring this about, so much the better ; the standard has certainly risen enormously during the last fifty years.

We are badly in need here, as Dr. Wellesz says, of trained musicologists. Good research work has been done, but I fancy no music student ever gets a proper training in the mechanism of research, the use of libraries, works of reference, periodicals, etc. This seems to be much better taught in the schools of modern languages, and has already borne fruit in some recent musicological papers written as *parerga* by researchers on French or German literature. And such training naturally assumes the existence of a working musical library, for which the Americans are generally much better off than ourselve s

Performance of Music at Universities

As to the performance of music at universities, outside the lecture-room, Dr. Wellesz's outlook is perhaps more Viennese than Oxonian at present. Before the days of the gramophone and the B.B.C., we had to make our own music, and it certainly was very rough. But we learned a great deal, not so much from hearing it as from taking part in it. All this has by now developed enormously; many undergraduates, women as well as men, play wind instruments quite well, and Oxford recently provided for *Idomeneo* an entirely undergraduate orchestra whose performance was well-nigh faultless. And it is right that the universities should get up performances of "museum pieces" both in music and in drama, such as operas of Purcell and plays of Ben Jonson; because for one thing university amateurs can give far more intelligent and convincing performances of them than professionals. They have also their appropriate academic audience which is prepared to understand these works. The educational value of such performances, always involving much real preliminary research before rehearsals begin, and including the work of rehearsal with all the moral co-operation required by it, is incalculable. "Q" told one of his Cambridge students that he would learn far more by acting in the Marlowe Society than by attending his own lectures.

Some experience of rigorous research is a most valuable training for any musician, especially for those who intend to become leaders of musical activity. But research by itself is no career in this country, and students are urgently in need of grants to undertake it, if only for a short period. If the B.B.C. wants trained musicologists, it ought to contribute towards the expense of their training.

It is most desirable that students should regard all music as a continuous history and not draw a distinction (as most Germans seem to do) between antiquarian music and modern music. Most of the recent music is certainly too difficult for amateurs to perform themselves, but the same was the case fifty years ago and amateurs now cope pretty easily with what was then thought impossible. At Oxford and Cambridge there is already a keen interest (at any rate among students) in the music of to-day, and it ought certainly to be given every encouragement.

THE UNIVERSITIES OF AUSTRALIA

By J. D. G. Medley

Vice-Chancellor of the University of Melbourne

Australia is a Federation of six States with a capital city at Canberra. Each State has one university situated in its capital city and last year there was founded at Canberra a National University which is, in the first instance at all events, to devote its energies entirely to research. In addition, there is at Canberra a small University College which presents its students for Melbourne degrees, at Armidale in New South Wales a University College which trains for Sydney degrees and hopes soon to take independent rank as the University of New England, and at Mildura in Victoria a residential branch of the University of Melbourne which deals with first year work only in certain subjects. There are thus in the whole Commonwealth seven Universities proper, two University Colleges and one attached branch. They contain at the present time some 20,000 full-time students and about 10,000 others who are doing courses on a part-time basis—which means that about 1 in 400 of Australia's population is a full-time student as opposed to a pre-war (1939) figure of 1 in 1,000.

As is everywhere the case, this state of things is of course abnormal. Our Universities are swollen with entries from the services in addition to the usual civilian enrolment, and we are encountering those difficulties in the provision of staff, accommodation and equipment which are the common contemporary lot. For the next three years we must expect a continuance of the struggle, by which time we may hope that material resources will have become adequate to cope with reduced numbers—whatever the figure may be. In the meantime the Federal Rehabilitation scheme, which I do not propose to traverse in detail here, is undoubtedly having the effect of steering in the direction of the professions a considerable number of those who would not under normal circumstances have considered such a career, and the universities have somehow to do them justice.

Our difficulties are particularly great, for we do not in Australia exercise the degree of selectivity which is the rule in Great Britain and America. The University of Sydney is forced by the provisions of its University Act to accept every entrant who is formally qualified

by matriculation for the Faculty of his choice. The University of Melbourne does refuse applications much in excess of the numbers it can adequately train, but it has to stretch its capacity beyond all reason and to proceed with the greatest caution. There is, I think, a twofold reason for this curious state of things. The number of our universities is limited and their distances from each other very great. It is not possible to say to a rejected applicant " We don't want you but after all there are other places which can give you what you want." To reject him damns his chances for good. And over and above that, a real appreciation of the importance of quality is not yet firmly implanted in Australia. There are no private Universities. All of them have always been and must now to an ever increasing extent continue to be dependent upon political sources for a large part of their annual income. It is right to put on record that Australian governments have used their power in this respect with the greatest self control and that the experience of our Universities over the vexed question of academic freedom has been on the whole very fortunate. But public opinion is sensitive upon the point, and I doubt very much whether it would tolerate the standards of selectivity which are invariably set by the great universities elsewhere.

My purpose is to give a general picture of our universities and not to dilate upon our present difficulties which are after all much the same everywhere. At the moment it is difficult to see the wood for the trees or to arrive at any but the vaguest estimates of what the general position is likely to be when some degree of ' normality ' returns. But Australian universities have a reasonable stretch of history behind them—both Sydney and Melbourne will be celebrating centenaries within the next seven years ; their performances, despite grave difficulties caused by poverty and isolation, have been comparable to those of far more fortunate institutions, and it is not probable that the immediate future will see any very radical changes in the pattern that has been evolved.

University Finance

The self control exercised by Australian governments in their dealings with universities to which I referred earlier has unfortunately been extended into the financial field. One of the first things to

strike an impartial observer would be the surprisingly small budgets upon which our universities operate. Income is derived as elsewhere from government grants, endowments and fees (except in the case of the University of Western Australia which is a ' free ' University and charges nothing for tuition). Fees are very moderate : the cost of a university year in a three year arts course is about £A35 ; the total cost of a six year medical course is £A300.* There is talk about raising them but the expressed policy of most Australian governments is to work towards ' free ' universities and it is very unlikely that appreciable budget relief will come from that direction.

As regards endowments, though there have been substantial gifts to universities notably in Sydney, Adelaide and Western Australia, the general picture is that income from this source is a comparatively minor item and is largely confined to special purposes. There are various reasons for this. There are few large aggregations of capital in Australia and a society whose money has been largely employed in the ups and downs of the pastoral industry is apt to be tenacious of its resources. It is only comparatively recently, moreover, that the universities have become really interested in the problem of their public relations and no serious attempt has as yet been made to capitalise the loyalty of alumni which is so prominent and profitable a feature of the United States. We have probably missed our chances in this field : it seems unlikely that under present taxation levels—even though gifts to universities are legitimate deductions—any substantial degree of salvation can be sought in this direction.

We are thus confronted, whether we like it or not, with the prospect of increasing dependence upon government grants and all that this implies. Before the war, State governments only were involved: under the constitution education at all stages was left as a State function. Beyond the annual provision of £30,000 for research in the physical sciences and the financing of a limited number of special Chairs, the Federal Government played no part in the university arena. But the last few years have produced radical changes. The Federal Government is now the sole income taxing authority : under the Rehabilitation Scheme it has disbursed some 1½ million pounds to the universities for capital equipment and subsidies in addition to fee payments :

* Excluding books and equipment.

as the result of a referendum held in 1946 it can now, if it so desires, constitutionally control social services, presumably including education. At the moment as the result of swollen numbers and inadequate staffs, the universities are more or less balancing their budgets. But during the next few years numbers will decrease (though to what extent is quite uncertain) as service men and women complete their courses, income will decrease, inasmuch as the service people will take with them not only their fees but a Federal subsidy of £ for £ on fees as well, and costs will most certainly not decrease proportionately.

All universities are thus faced with the prospect of a rapidly increasing gap between their income and their expenditure which can only be filled by a reduction in expenditure so drastic that standards will practically cease to exist, or an increase in government help on a scale which may well be beyond the capacity of State governments to achieve. The universities themselves would in all probability welcome the establishment of a Federal body on the lines of the British University Grants Committee, despite the very real difficulties of finding in Australia available persons of sufficient standing and knowledge to man it—provided it were given the same complete freedom of action that committee possesses and adequate funds to disburse. But all that can really be said at the moment is that the financial future of our universities is obscure and worrying, and that during 1948 there will be a great deal of three-cornered arguments on the subject between Federal and State governments and the universities themselves. In the meantime the University of Melbourne, with some 9,000 students, to take one example, can command from all sources annual receipts of about £500,000—almost exactly the same as the University of Birmingham with 2,600 students. No wonder Australian Vice-Chancellors grow prematurely old!

Disadvantages of Homogeneity

I referred earlier to poverty and isolation as our two main handicaps. They are alike responsible for a striking feature of our universities—their complete homogeneity of type and the very limited amount of staff and student migration that takes place between them. There has never been enough money for bold experiment or enough

competition to encourage variations in pattern. There is no Oxford or Cambridge in Australia to act as a magnet for the best brains and a refuge for the humanities : there are no liberal arts colleges designed to give a pre-professional training or to cope with the needs of those who do not intend to qualify for a profession. The average Australian student matriculates at the age of 17½, comes up immediately to his own State university, goes into a professional school and proceeds to qualify for entrance to the earning arena in the minimum time possible. Our universities in short consist of a collection of professional schools and, save for such minor variations as the fact that there are as yet no medical schools in Western Australia or Tasmania, and that the teaching of Veterinary Science is largely centralised in Sydney, they all teach the same subjects, in the same sort of school, in very much the same kind of way.

They reflect the community in so doing. Australia is a large continent but, though experts profess to be able to distinguish between Victorians and Queenslanders at a glance, Australians wherever they live do in fact talk and think and look at life with very little variation of accent or attitude. It is easy to point to the defects of so exclusively professional a training, to stigmatise our universities, as their critics are fond of doing, as ' nothing but technical schools,' and to reinforce the criticism by reference to the fact that only a very small proportion of our students—not more than 10%—reside in colleges or hostels during their university life. Each university has affiliated to it colleges which are owned and managed by governing bodies appointed by religious denominations, and in some cases these colleges provide a tutorial system for their residents and play an important part in the affairs of the university. But at present it is not the declared policy of the universities to enter this field themselves and, if it were, it is most unlikely that money would be available to construct hostels on any large scale.

The exceptions to this statement are the New England University College at Armidale which is largely residential and the Melbourne experiment at Mildura where 560 first year students are housed in an Air Force camp in which, owing to distance from Melbourne and lack of local facilities, residence is compulsory. One year's trial, generously backed by the State Government of Victoria, has tended

to show that the experiment is a success from most points of view and it may well encourage further developments on these lines in other parts of the country. But I think it safe to say that the majority of Australian students will continue to live either at home or in lodgings, and in theory of course this must militate severely against their enjoyment of a full university life. Many do undoubtedly regard their university purely as ' a shop '—a place to get into and get out of as quickly as possible. But it would be a grave error to dismiss Australian universities with a wave of the hand on this account. The admitted quality of good Australian students—and they are produced in large quantities—would alone suffice to confound the too caustic critic. What saves the situation is the fact that each university does get its full share of the best brains of its own State : there are no counter attractions elsewhere and our early age of matriculation compared with Great Britain has the result that even the small numbers of those whose ambition is to go abroad tend to do a course in Australia first.

Our universities are much more than technical schools. In all of them there is intense extra-curricular activity, which has tended in the recent past to take a largely political flavour but is now being increasingly reinforced by aesthetic and social developments. Student Representative Councils are very vigorous and co-operative and are represented in some cases upon university governing bodies. The general tone of all universities—particularly at present with the large influx of minds maturer than ordinary—is one of high seriousness and there is remarkably little of that kind of activity which has to be excused by a reminder that ' boys will be boys.' The Australian student can, if he so wishes, live a very full and exciting life and though critics of ' student apathy ' are always with us, they have far fewer grounds for serious alarm than was the case a few years ago. It is sometimes said that only by an increase in the length of all courses, and the insertion of at least two pre-professional years of general subjects can a balanced university education be achieved in Australia. ' Had we but world enough and time ' that might well be so. But the time factor is decisive and the Australian world at any rate would not be content to wait or to pay for graduates who required a minimum of six to eight years' training before setting about the business of earning a living.

Research

The picture assumes a much gloomier tone when we proceed to consider the position of that all-important university function—research. Lack of resources and the consequent over-burdening of staff with teaching duties have combined with our isolation from the main centres of original work to restrict the activities of our post-graduate schools to a deplorable extent. There has been a constant pressure on the part of our better younger workers to take advantage of the superior facilities available in Great Britain and America, and the resulting adverse balance of trade in brains has been causing concern for some time past. There is no lack of first-rate raw material in the country: good work is done in bits and pieces in all the universities and the successes gained abroad by Australians in all fields leave no room for contradiction. But the volume of work that can be achieved under existing conditions is not such as to make university research the educational and social force that it ought to be, and still less to make it a means of attracting to Australia first class brains from the other side of the world.

There are, however, two recent developments which afford some belief that better days are coming. One is that the Federal Government has trebled the annual grant to universities for research in physical and social science and there are hopes that the total available may shortly be further increased to £140,000. The other is the foundation of the National University at Canberra and the provision for it of funds—some £375,000 a year—on a scale which will make the establishment of first-rate research schools feasible. The new university is to restrict itself to start with to research only, and steps are being taken to set up four institutes to work in Physical and Medical Research, Social Science and Pacific Relations. No appointments have as yet been made but negotiations are in active progress.

There has been much criticism of this decision which was sprung upon the Australian people with little or no previous discussion. It has taken the obvious lines that it would have been much wiser to spend the money on building up strong schools in the existing universities and that Canberra, which has been unkindly described as 'Six Suburbs in search of a City,' is no place in which to isolate research workers at the present stage of its development. Against

this it can be said that the centralisation of available funds is much more likely to produce a really attractive foundation than their piecemeal dispersal and that the kind of society which will develop around it is exactly what is wanted to make Canberra into the real capital city of a great Commonwealth which it ought to be. In any case the decision has been made and critics must make the best of it. Existing universities can derive nothing but profit from the new institution provided that those in charge of it realise that research cannot flourish *in vacuo* and that the rapid development of research schools throughout Australia is an essential pre-requisite to their own success.

There must obviously be the closest co-operation between Canberra and its sister universities not only in research but, it may be hoped, in teaching as well—co-operation which the very advanced and efficient internal air services of Australia render entirely feasible. Above all, the new foundation does hold out real hopes to the younger generation of Australians that it will now be possible to enter upon a career in research without the urgent and expensive necessity of certainly a period and possibly a life spent abroad. The importance of this for both the individual and the nation can hardly be exaggerated.

The Future

It has been impossible in an article of restricted length to do more than touch on a few aspects of the whole picture. Those who administer universities in these days find it difficult to face the future with equanimity. It is no longer possible to dream of the unexpected millionaire who at one wave of his magic wand will remove the wrinkles from a Vice-Chancellor's brow. We have to deal more and more with the unpredictable politician. But I have hopes that he will gradually follow the example of Great Britain and America which are both pouring money into their universities on a long-term basis as the best of national investments in a difficult world. If and as our poverty vanishes, so too will our isolation; which from the point of view of those who make or mar universities—their teachers—is the greatest single obstacle to that real progress which we all desire.

THE GRADUATE AND THE NEWSPAPER

By J. C. Beavan

London Editor of the "Manchester Guardian"

Since 1939, the circulation of almost every newspaper has increased; and some newspapers have gained a vast number of new readers. The *Daily Express*, for example, has put on more than 1,300,000 copies a day and brought its circulation up to almost 4,000,000. * The *Daily Mirror* has done even better and may have reached 4,000,000. Many people who seldom read a newspaper before the war are now "regular readers." Many people who read only one newspaper now take two or even more.

The war created these new demands. Bombing, like hanging, concentrates the mind wonderfully. Those who before the war could only dimly see the relationship between national affairs and their private lives had it brutally brought home to them. There were queues for newspapers. Everybody had coppers to spare for news and as newspapers were much smaller, (they had been reduced from 20-32 pages to 4), one needed several to occupy the time which used to be given to one newspaper.

Habits of newspaper reading acquired during the war have persisted until now and there is no sign that they will be discarded. More than 18,000,000 newspapers are sold each morning (more than one per family) and 28,000,000 are sold on Sundays. Even if money were tighter, goods less scarce and newspapers were larger, newspaper circulations would undoubtedly remain higher than they were before the war. And it is not only a matter of habit. The more directly a Government intervenes in economic affairs, the more conscious the citizen is of acts of government. He must buy a newspaper to find what he is expected to produce and what he can hope to consume.

The increase in newspaper reading is almost wholly a good thing. Even the more frivolous newspapers contain little that is harmful and a great deal that is good. They now carry a higher proportion of serious news than they did in 1939 and some of them have informed the Royal Commission on the Press that their readers show greater interest in public affairs. (There is an even more marked increase

* The figures in this article are taken from British Newspapers and their Controllers by Viscount Camrose (Cassell).

of interest in sport and entertainment, but that is not of course incompatible with a wider interest in serious subjects). And while the popular newspapers have been going ahead the " more serious " newspapers have also made striking gains. The *Telegraph* has advanced from 756,285 to more than 1,000,000, the *Times* from 200,000 to 270,000. The *Manchester Guardian*, with a circulation of 50,000 before the war has now more than twice that figure.

The picture then, is comparatively, a cheerful one. More people are reading newspapers; more people are going to more than one newspaper for facts and opinions; and more people than ever are reading those newspapers which treat public affairs most seriously. But when one looks at the figures absolutely, they are rather depressing. The most serious newspapers in this country contain very little that is outside the interests of a well educated man or woman; little that cannot be absorbed in the casual circumstances in which a newspaper is read—at the breakfast table, in train or bus, club or common room. Although they are " serious " they remain journalistic productions; they are not written for the specialist or for the study. Yet the joint daily circulation of the *Times*, *Manchester Guardian* and the two great Scottish newspapers is less than 600,000.

The Graduate and the Serious Newspaper

It was suggested recently that this figure is about equal to the number of people in this country who have passed through a university. I have tried without success to find the number of living graduates but it is probably less than half a million. It can however be said that if every graduate took one of the " more serious " newspapers then circulations would be much higher than they are to-day. Their readership should also include members of those professions who have high educational qualifications but have not necessarily been to a university. (There are about 24,000 solicitors and about 140,000 non-graduate school teachers for example). How many of them, one wonders, go to the best sources for their knowledge of what is happening in the world? If, as I believe, only the " most serious " newspapers provide enough information to satisfy the intelligent student of affairs, then the number of intelligent students is regrettably small. It must be remembered that all these newspapers (including

the *Times*) are in a sense local newspapers. They are bought by many people who take less interest in their political columns than in their births, marriages and deaths, legal and property announcements, commercial news, concert, dramatic, cricket and rugger reports. Against this however must be set the number of people who see these newspapers in libraries or clubs.

Without looking at statistics, one knows from experience that there are many people of high educational attainments who are content to take their facts from the gay, attractive and technically brilliant newspapers which are produced to appeal to those who have had a minimum education and want the simplest outline of events served up in a dramatic style. There are others who seldom read newspapers at all.

The Educated Classes not Politically Educated

I think one can also argue from observation that many people who belong to what are known as the educated classes cannot be called politically educated. A vocational training may develop an ability to think clearly; but clear thought is not enough. To-day some study must be made of the facts. They are no longer universally known.

In the last century, great public questions were usually before the public for many, many years. By the time a man was 21 he could hardly fail to know a good deal about the Irish question or women's suffrage. Foreign affairs was a subject which even the professional politician could afford to neglect. Newspapers contained far more comment about events than they have to-day and they had fewer events to record. Moreover a higher proportion of students came from the governing class, knew they would be called upon to govern and were therefore interested in government. Those were the days when a reputable newspaper could take a bright young man from a university, instruct him to " get up " a major subject and expect him to produce sensible leading articles within a few weeks of entering journalism. A far longer apprenticeship is needed to-day. There used, too, to be " general " leader writers, a doughty race of men who could take any subject and within an hour write well and illuminatingly upon it. The tendency to-day is to have leader writers who are

specialists on India, on France, or America, on the social services, or finance, etc. Events not only move swiftly. There is an immense documentation of everything that happens. Nobody, whether he be an editor or Prime Minister, can know as much as he ought to know.

Education in Public Affairs

Perhaps the complication of politics to-day is in itself a discouragement to a serious man. He may feel that it is better to keep away from public affairs rather than take a half-baked interest in them. But it is surely a matter for profound regret if many of the best educated citizens in a community take little interest and no active part in its affairs ; and if those who are responsible for educating the young and leading organisations which create opinion are content with anything less than the best sources for their knowledge of events.

There is a problem here both for the schools and the universities. It would be presumptuous of me to suggest what might be done but perhaps I may say that it would surely be a good thing at least if Sixth Form students and undergraduates, whatever their course of study, were encouraged to read good newspapers. The universities have done a great deal by their interest in Adult Education to educate in public affairs those who have not had a good general education. It is odd that they have done so little for those who have been " well " educated but not in those things which concern us as citizens.* There is, I am sure, a demand for such education among graduates (they flocked into the Left Book Club before the war). Perhaps even now they are finding something of what they want in the Bureau of Current Affairs. But do not they require something which goes a little deeper ? Has not the time come to create a *Professional* Workers Educational Association ?

*We shall be returning to this subject in our next number.

ENGINEERING AT THE UNIVERSITIES

Introduction

The future standard of living in Britain depends on the productivity of its industries. One major factor will be the skill and power of its engineers in research and in the development and design of the necessary machinery and plant for all the various industries. During the war Britain distinguished itself in the realm of pure science, but the rapid and large-scale development of new discoveries was carried out more successfully in America and in Germany than in this country. The following articles discuss the part that the universities have played and are playing in engineering education and research, and some of the lines on which developments might be desirable.

The first two contributions are by Professor Sutton Pippard and Professor Willis Jackson, who hold the Chairs of Civil and Electrical Engineering respectively, at Imperial College. Professor Sutton Pippard describes the work of the Engineering Department, discusses the Engineering Departments at other universities and stresses the importance of more research and post-graduate work. Professor Willis Jackson's note deals with several aspects of electrical engineering education and research and stresses particularly the importance of a suitable education in the fundamental sciences.

The other two articles are by Professor T. C. R. Fox, who holds the Shell Chair of Chemical Engineering at Cambridge, and Sir Ewart Smith, Technical Director of I.C.I., both of whom have recently returned from visits to the U.S.A. to study engineering (and particularly chemical engineering) education and research in that country, the one from the point of view of a university teacher, the other from the point of view of an industrialist.

We hope that these articles will give added strength to the movement, which already exists, for a comprehensive inquiry into engineering education at the universities.

The general effect of the views put forward suggests that the present three-year engineering courses for undergraduates in a good university department in this country are as good as anywhere in the world, but that the number of graduates and still more the number of post-graduate students, and the amount of research work have been inadequate. An inquiry would certainly cover these questions.

But these matters are not the only ones worth investigating; and America is not the only country from which we may get useful information. For instance, the Swiss Federal Institute of Technology at Zurich has an Engineering Department with an international reputation. The course is a full four and a quarter years. Each year consists of two terms and five months vacation. The staff unanimously regard a four-year engineering course as insufficient, and there has recently been a good deal of discussion as to the desirability of extending the course to five years. Regretfully this has been rejected as impracticable. But if a relatively poor country like Switzerland insists on a minimum course of four and a half years, are we right to be content with three years—which is probably the shortest engineering degree course in the world?

Another remarkable aspect of the work at Zurich is the voluntary courses in the humanities. From five to seven o'clock every afternoon lectures are given on the humanities. No lectures or laboratory classes are allowed on technical matters during those hours. It is compulsory for all students to attend at least one course in these cultural subjects in order to be granted a diploma. There are no examinations on these cultural courses, but there is a strong tradition, which is generally supported by the staff, that students ought to attend them. And in fact they do attend in large numbers.

The staff on the humanities side is considerable and includes several full professors. The lectures given each week during the winter term of 1947 were as follows:

Literature, languages, philosophy	34	Total
History and politics	9	
The arts and history of art	9	
Economics and law	12	64

The following additional facts as regards university engineering education in this country support the need for such an inquiry:

1. *In Chemical Engineering* the United States have some 40 recognised schools, and in 1942 America had 500 students working for a master's degree and 100 for a doctor's degree. Great Britain at the end of the war was producing only some 50 graduates in chemical engineering a year. A number of firms have now made large gifts to several universities, which should do something to remedy this

deficit, but this is a generation late. And even now is the provision adequate ?

2. *In Coal Mining* the position has been even worse. Before the war there were only eight Schools of Mining turning out between them 20 graduates annually. Most of these university departments have in the past been endowed by local people and the endowment was totally inadequate for the needs of the nation. There is nothing approaching a first-rate school of mining engineering comparable to that at Bochum in the Ruhr. The Coal Board is now tackling this problem and contemplates large increases in the number of students. This is again a generation too late.

3. *In Aeronautical Engineering* the lack of university education and research was so great that the Government, with the encouragement of Sir Stafford Cripps, and after what was inevitably a hasty war-time inquiry, founded an entirely new graduate college, quite independent of the universities and very heavily endowed.

These three examples show that the development of engineering schools, especially in its more technical post-graduate aspects, has been erratic and unplanned. It seems clear that the time has come for a full survey of university schools of engineering to cover :

(*a*) Numbers—undergraduate and post-graduate
(*b*) Research
(*c*) Need for new developments
(*d*) Length of course
(*e*) General education.

And since the responsibility has now been laid on the University Grants Committee to ensure that the universities meet the needs of society, it is to be hoped that they will appoint a suitable committee to instigate such a survey and report. This might be a sub-committee of the U.G.C. similar to the sub-committees on medical education, on the Scarbrough Report and on the social sciences. These committees are administrative committees recommending grants for specific purposes, but the University Grants Committee has also a Science Committee which is surveying the whole field of university work in science, and to some extent in technology. A comparable committee to inquire into technology might be a more effective means of securing rapid results at this stage.

ENGINEERING STUDIES IN BRITISH UNIVERSITIES

By A. J. S. Pippard

Professor Pippard held the Chair of Engineering in the University of Wales at Cardiff College from 1922-1928. *From there he succeeded the late Professor R. M. Ferrier as Professor of Civil Engineering in the University of Bristol until* 1933. *He is now Professor of Civil Engineering in the University of London at Imperial College.*

The war has produced deep and lasting effects upon the universities; some of these are already evident, others will only appear in the course of the coming years. Some changes were inevitable in any event and their occurrence now is due to an acceleration of tendencies which were apparent before 1939, but others are more radical and arise from altered economic and social conditions. Probably no branches of study have been affected more than the applied sciences and in this article an attempt is made to assess the present position of university studies in Engineering. Attention is restricted for convenience to Civil, Electrical, Mechanical, Chemical and Aeronautical Engineering; Mining and Metallurgy have been excluded since the administrative position of these subjects varies in different universities and makes comparison and generalization difficult.

A complete analysis of the factors affecting the problem of university education for engineers to-day is beyond the scope of this article but some of them must be noted briefly to understand the position.

Qualifications for Entry

It was becoming evident before the war that the conditions of entry to engineering courses would soon need modification. The education of the engineer, as that of any other professional man, starts not with entry to a university but much earlier. For long it was assumed that a standard of education represented by the ability to pass the Matriculation Examination of a British university or a School Certificate equivalent was an adequate preparation for university

engineering studies. The most notable advances made in Physics, Chemistry and Metallurgy, however, during the interval between the two wars, were exercising considerable influence upon most branches of engineering and the need for a broadening of the scientific foundations of the undergraduate course was apparent. Such broadening, however, required a higher standard of education upon entry, and it would, under normal circumstances, have taken a considerable time to introduce such a change. The premium set during the war upon the possession of a Higher School Certificate as a condition for the award of a state bursary and the demand for more trained scientists and engineers have led to a great increase in the number of would-be university students holding this Certificate, and this has made it possible to introduce reforms. In the University of London an entrant upon an Engineering degree course must now have passed or been exempted from both the Matriculation and the Intermediate Science examinations. Exemption from the latter may be obtained by a Higher School Certificate in Pure Mathematics, Applied Mathematics, Physics and Chemistry. The rather exceptional boy will therefore be qualified to enter upon a university course at the age of 17 to 17½ while the average boy will be about a year older, although the obligation of military service will for the next few years limit the number of those who proceed direct from school to university.

The universities have increased their intake considerably in response to the demand for more engineers, but probably every available place is filled and many would-be entrants are disappointed. Several answers to this have been suggested ranging from " shift " working to the foundation of new universities and the recognition of selected technical colleges as degree-awarding institutions, but the question is too complex for discussion in the present article.

The final factor in the post-war problem to be noted here is the increasing demand for post-graduate studies and the greater recognition of the importance of research. In the past university engineering schools have made little provision for systematic post-graduate study. The necessary broadening of the scientific foundations of the undergraduate course already mentioned means that little time will be available for attention to be given to particular aspects of engineering. But some branches are developing rapidly, and the acquisition of the

specialised knowledge necessary before a graduate can wisely be left entirely to the individual effort of the man himself must be fitted in. The form of post-graduate courses must depend on the subject and desirable duration of study and also on the district where they are needed. In some cases a technical college, or industry itself, may provide such courses better than a university, but whatever the method, adequate provision ought to be made at once.

Undergraduate Education

At this point it is desirable to concentrate attention upon one curriculum in order to form a picture of the general scheme of undergraduate education. The courses outlined are those of the City & Guilds College of the Imperial College of Science and Technology which is one of the engineering Schools of the University of London. The courses of other Schools of the University differ in detail, but broadly speaking, the principles observed in British university education are much the same.

It has been explained earlier that entry to engineering courses in the University of London is dependent upon success at the Intermediate Science examination or its equivalent. The first year is devoted to the study of Applied Science and follows naturally the Pure Science covered by the Intermediate Science or the Higher School Certificate work.

At the end of the first year students take the Part I Examination for the degree of B.Sc.(Eng.), and, if successful, they are allowed to proceed to the Second Year which leads to the Part II examination. At this stage, the student chooses which Department (i.e., Civil, Mechanical or Electrical Engineering) he will join. In some universities, notably Oxford and Cambridge, the undergraduate courses are not differentiated in this way but the distinction is not fundamental.

Until recently the Engineering degree at London could be obtained three years after Matriculation on the combined results of Parts I and II. Under the new regulations the undergraduate must complete a further year after passing Part II. This consists of a more selective course of study than in the first two years, students being allowed to develop special interests.

An interesting innovation has been made at the Imperial College in this connection. Students will not be subjected to formal written

examination by the university at the end of the third year but, instead, their work will be assessed by their teachers. Part of the year will be devoted to a design or experimental exercise which will form the subject of a dissertation. The combined results of the Part I examination, Part II examination and Part III assessment suitably "weighted" will determine the final classification of the candidate. This may appear somewhat unusual, but a similar system operated at the Imperial College for many years in connection with the award of post-graduate Diplomas and has proved satisfactory. Under this system students can spend part of their time outside their own Department, e.g., in Mathematics, Physics or Economics Departments or in a non-scientific Department such as Law or History of Science.

Post-Graduate Studies

The British system of undergraduate education produces results as good as any in the world, but a similar claim for the efficiency of post-graduate studies can scarcely be maintained. Most British universities have no postgraduate school of engineering and a student who, having taken his initial degree, wishes to continue his studies in a particular branch finds it difficult to do so.

Comparisons, seldom to our credit, are often drawn in this respect between the British Universities and the Hochschule of the Continent or such establishments as the Massachusetts Institute of Technology. They are often made on a somewhat unfair basis, but even when allowance has been made for different systems, for the different meanings of words and for the numbers of students involved, the fact remains that opportunities for postgraduate study in this country lag behind requirements.

By the terms of its Charter the Imperial College stands alone in being specially charged to develop postgraduate studies in their application to industry. It has done much in this direction but will it ever be able to cover more than a fraction of the subjects calling for attention? Ought it indeed to try to do so? If the answers to these questions are negative, it is of vital importance to face the problem of increasing facilities for other kinds of education.

Research

The position of research as distinct from postgraduate study is somewhat better. Most university Engineering Departments devote

some attention to research but generally not nearly enough. There are various causes for this neglect; many men who give devoted service as teachers have no inclination or flair for research; others have been obliged to give so much time to teaching as to leave no energy for other activities. Some with time, energy and desire have been handicapped by lack of funds. Finally, and from some standpoints perhaps this is the most serious difficulty, men of proved ability find that the more senior posts entail so much time spent on administration that little is left for research or for directing their students.

This must be remedied if research is to take its proper place in university Engineering Departments and there should be no mistake as to the importance of this. The teacher not engaged in research seldom keeps a lively interest in his subject and his work suffers. But apart from this it is one of the main functions of the universities to develop research—partly for results, but perhaps more important still because research workers are needed in industry and the education of some of them at least is the duty of the universities.

It is perhaps reasonable to hope that in future, funds will be sufficient to eliminate the plea of poverty as an excuse for neglecting research; most universities recognize now that the time devoted to teaching by members of staff should be limited and other difficulties in the way of activity in research are capable of easement. The extent to which more active research programmes are developed will thus be a measure of the vitality in our Engineering Departments.

Statistics for Session 1946-47

To gain some idea of the immediate post-war position the author asked Professors of Engineering in the universities and University Colleges of England, Scotland and Wales to supply figures of student and staff members for the session 1946-47. The replies are collected in the Table on page 172. The figures relate, except where specially noted, only to those branches of engineering specified on pages 164 and 165 and are not overall figures for Faculties of Applied Science. Postgraduate students are those who have completed their courses for an initial degree, whether Pass or Honours, and are spending a further period in advanced work other than research.

Readers in a British university are independent teachers and

would in most Continental and American Universities rank as Professors. It was therefore felt that a fairer picture of the staffing of our own Institutions would be given if they were included with Professors. A slight difficulty arises since two or three universities with a number of very senior teachers do not use this title, but for estimating purposes fifteen have been added arbitrarily to the tabulated figures for this group.

The figures may then be summarized as follows :—

Total Number of Undergraduates	4562
Total Number of Research Students	369
Total Number of Postgraduate Students	169
Grand Total of Students	5100
Total Number of Professors	61
Total Number of Readers say	44
Grand Total of Senior Staff	105
Number of Undergraduates per Professor (or Reader)	44
Number of Students (total) per Professor (or Reader)	49

Only those are included for which explicit permission was given to do so. In all cases the information was readily given but in a few instances extraordinary conditions obtained which make it impossible to give figures for the Session which might not be misleading and these have therefore been excluded. Their inclusion would not alter the staff—student ratios appreciably and in spite of the unavoidable omissions the table presents a reasonably accurate picture of the present position.

Attention has already been drawn to the special Charter of the Imperial College of Science and Technology and this is reflected in the number of research and postgraduate students. The figures provided and quoted in the Table were not sufficiently detailed or complete to justify very exact deductions being drawn, but if it be assumed that the numbers will remain reasonably constant over the next few years, the number of engineers graduating annually will be between one-third and one-quarter of the number of undergraduates, i.e., about 1,300. This is probably a conservative figure since certain universities in the United Kingdom do not appear in the list for the reason previously mentioned. It would have been of interest to obtain similar data to those tabulated for Continental and American Institutions but this was generally impracticable.

NUMBERS OF STUDENTS AND SENIOR STAFF

UNIVERSITY OR COLLEGE	Full-time Students			Total	Full-time Senior Staff	
	Undergraduate	Research	Postgraduate		Profrs.	Readers & Assst. Profrs.
Aberdeen University	110	—	—	110	1	1
Birmingham	351	30	1	382	5	1
Bristol	179	4	—	183	5	1
Cambridge	656	23	2	681	3	—
Cardiff, University College	103	—	—	103	1	1
Dundee University College	100	1	—	101	1	—
Edinburgh University	172	—	—	172	2	1
Glasgow, Royal Technical College	405	14	—	—	4	—
Leeds University	220*	13	6	239	4	—
Liverpool University	247	7	3	257	3	—
London, Imperial College	413	140	115	668	9	9
London, Kings College	119	12	—	131	3	4
London, Queen Mary's College	101	33	3	137	2	2
London, University College	162	7	38	207	6	2
Manchester University	180	15	—	195	2	1
Manchester, Coll. of Tech.	330	46	1	377	2	1
Newcastle, Kings College	255	5	—	260	3	—
Nottingham, Univ. College	150	2	—	152	2	1
Oxford University	53	7	—	60	1	1
Sheffield University	140	10	—	150	1	3
Southampton Univ. College	116	—	—	116	1	—

* This includes a number of mining and metallurgy students.

Conclusions

In the Report on "Higher Technological Education" presented to the Minister of Education in 1945 by the Committee presided over by Lord Eustace Percy the annual average output of professionally educated Civil, Mechanical and Electrical Engineers for 13 years before the war is quoted as 2,100; 2,300 being given as a probable over estimate for the year 1938. These figures included all sources and 35%, or about 750, were drawn from the universities. This number was inadequate for war purposes and after intensive efforts to increase it, the national output in 1943 reached a figure of 3,000 of whom about 1,250 came from the universities (including the Royal Technical College, Glasgow, the London Polytechnic and the Manchester College of Technology).

The Percy Committee stated that the problem was to maintain the output for at least 10 years after the war. Examination of the statistics for 1946-47 given earlier show that if present numbers are maintained an annual output of about 1,650 (including graduates of London University from Technical Colleges) may be expected. Some of these will be in branches other than Civil, Mechanical and Electrical Engineering, but even allowing an ample margin for these and for a possible falling off in numbers towards the end of the decade it appears that the university quota is likely to be achieved. It is, however, being met by methods which cannot be tolerated for long if efficiency is to be maintained. More accommodation, more teaching staff and more equipment are urgent requirements and should constitute a first claim upon university funds.

Improvements in undergraduate education bring with them greatly increased demands for postgraduate courses and in most cases these will have to be organized from the beginning owing to past neglect. If the best use is to be made of the sound foundation of undergraduate instruction to be obtained in this country it must be possible for all who need to do so to build upon it a superstructure of advanced technical education. This will mean big developments in institutions already catering for postgraduate work and the development of new centres for specialized branches of technology.

In view of the changes in the economic and social structure of the country, is it to be assumed that the numbers of engineering graduates already quoted as a target for the first ten post-war years may be accepted today without modification? It appears to the writer that this problem should be kept constantly under review and an estimate of future needs made from time to time. It is important to industry that there should be no shortage of skilled and trained men when they are required, but it is equally important that there should not be a surplus which would tend to reduce standards of remuneration and deflect the best of our young men into other professions.

If the universities were provided with such estimates, they could exercise a valuable influence in regulating the output by advice to students and their guardians.

A NOTE ON ELECTRICAL ENGINEERING

By Willis Jackson

Professor of Electrical Engineering at the Imperial College of Science and Technology, London.

Professor Pippard's claim that the British system of undergraduate education in engineering produces results as good as any in the world is no doubt justified, but we shall be wise not to accept it complacently. The foundations of many aspects of engineering are changing, and changing rapidly, and this calls, in my opinion, for urgent attention to the need, which he expresses, for a broadening of the scientific basis of this education. Taken as a whole, the engineering schools concern themselves too much with established engineering knowledge and technique and too little with the trends of scientific progress and its likely impact on engineering development. This impact has been particularly direct in the field of electrical engineering, with which I am concerned, and in so far as it is a primary function of the graduate engineer to translate the discoveries of science into successful engineering development, it is essential that his undergraduate course should afford adequate contact with the physical and chemical principles underlying these discoveries. There is no doubt of the general intention in engineering schools to concentrate on fundamentals; what is in doubt is whether the fundamentals being taught are fundamental enough. This is not to argue that before a man may properly embark on a study of engineering science he should follow the orthodox course of the physicist or the chemist, or some combination of the two—the intending engineer would react strongly against such treatment—but it does argue that too narrow an interpretation is being given to what is called engineering science to meet the needs of the developing situation.

Co-ordination with other Subjects

The needs in this respect will not be met merely by imposing attainment of Higher School Certificate standard as a condition of entry. They involve a closer co-ordination of the engineering teaching with that in physics, chemistry, metallurgy and mathematics than is usual; and in so far as progress in many branches of engineering is likely to be governed by improvements in materials, a particular aim

of this co-ordination might well be to ensure a basic understanding of the factors which determine their physical, electrical and magnetic properties. The manner in which such an aim—and there are other allied ones—might best be effected will vary from school to school, but much of the effort must come from the engineering staff itself if the well-established concepts of engineering science are to be properly refreshed and extended.

Changes in this direction would necessarily involve a reduction in the technical content of undergraduate courses—probably more so at this stage on the electrical than on the mechanical and civil sides—but this would not matter given an adequate provision of post-graduate course related appropriately to schemes of industrial training and to the needs of the early years of responsible experience. As Professor Pippard mentions the organisation of such courses can take several forms, which I will not enlarge upon ; the important thing is to press for all possible forms to be developed to the full without delay.

The governing consideration at the undergraduate stage is not the amount of detailed knowledge of analysis and technique which the undergraduate acquires, though he must learn a good deal of both, but whether he learns how to acquire it for himself, and how to use it intelligently, when he needs it ; not merely how to obtain a solution given all relevant data, but how to apply himself to a problem of which he has no detailed knowledge and for which he must find his own data. Of necessity there must be both formal lectures and standardised laboratory experiments throughout the course ; but in the final year at any rate we must aim towards the replacement of a substantial proportion of these by independent reading, informal discussion and student lectures, and guided, rather than routine experimentation, and give particular attention to the vexed problem of report writing.

Humanistic Studies

Changes in these directions are in fact occurring ; and in another which also involves a reduction in the technical content of the undergraduate course, namely the introduction of humanistic studies. There is no case, in my opinion, for going as far in this direction as is common in America ; but in so far as his creative work tends at one and the same time to improve the potential standard and amenity

of life and to endanger social stability, the engineer should at least acquire some appreciation of the social implications of his creative effort. A course which aimed to give a clear historical understanding of the parallel growths of science and engineering on the one hand, and of social customs, relations and institutions on the other, and of how these have reacted on each other, would do much to prepare the undergraduate for his entry into industrial life. However—desirable though the latter objective may be—I would not wish the possible subjects of study to be wholly conditioned by it.

A fairly common provision falling into the above mentioned category is a course in Industrial Administration. This subject, I consider, is unsuitable for undergraduate study, and can be handled with profit only when a man has gained, or is in process of gaining, industrial experience. The case for its inclusion might be strengthened, however, if it were to become the general practice for prospective engineering undergraduates to spend a year in industry between leaving school and entering the university. This procedure was followed to a limited extent pre-war in respect of electrical engineering, and has received strong support from the Institution of Electrical Engineers in its recent report on Practical Training.* In view of the issue of this report it is not perhaps necessary to do more than mention the great importance of systematic practical training as a supplement to undergraduate courses in engineering and the lead which the electrical industry has given over a period of many years in making provision for it. This industry affords an example which others would do well to follow.

The importance of an intimate link between the engineering schools and industry in this respect cannot be over-emphasised. University courses in engineering do not produce engineers; they afford a means by which men acquire the broad scientific and technological education appropriate to entry upon a professional engineering career. It is for industry to provide the strictly engineering training. The production of engineers of the highest calibre is a joint responsibility of the educational institutions and industry, and it is on the effectiveness of this joint effort that we shall stand or fall

* "The Practical Training of Professional Electrical Engineers," published by the Institution of Electrical Engineers, July, 1947.

as an industrial nation. It is well we should be critical of university engineering courses, but at the same time not forget that at the best they cover only part of the job.

In any discussion of numbers it is essential to take account of the large number of men—comparable with that of the graduate class—who, in electrical and mechanical engineering, attain professional status by attendance, *during employment*, at part-time technical college courses leading to Higher National Certificates.

The engineering industry of this country has benefited enormously from the existence of these complementary streams of candidates for professional status. Considerable improvements in National Certificate courses are resulting from the present widespread willingness of industry to release students for part-time day study, while the the post-war provision of a substantial number of Technological State Scholarships now makes it possible for the best of the men attending these courses to transfer to full-time university study. In reverse, it is likely that a good proportion of our undergraduate engineering students are more suited to the National Certificate approach than the degree one.

These considerations are relevant to arguments for a large-scale increase in undergraduate numbers. Granted further improvements in National Certificate courses and in industrial provision for contemporary practical training, it is possible that the present number of university undergraduate engineers, *if properly selected*, might be adequate.

In conclusion I should like to make the point that we must make a more deliberate attempt to attract for post-graduate study and research in the universities and larger technical colleges, and for training in industry, the best graduate products of overseas countries, the Dominions and Colonies in particular. If we do not, these men will take advantage of the extensive facilities available in the United States, and the long-term economic consequences for this country will not be unimportant.

TECHNICAL EDUCATION IN THE UNITED STATES AND BRITAIN

By T. C. R. Fox

Shell Professor of Chemical Engineering, University of Cambridge.

The present economic difficulties of Great Britain are causing an increasing number of our people to wonder whether we should not learn many lessons from the United States, where an enterprising exploitation of unrivalled natural resources has resulted in a standard of life which is the envy of the world. In particular any one interested in engineering education must question whether much of this great productivity results from America's much larger output of technically-trained personnel. Of course no simple answer can be given. American prosperity grew alongside technical progress and was probably engendered more by individual enterprise and a constant preparedness to take great risks, than by abnormal technical skill. But in the course of its development America has acquired a great number of technically trained men, produced by many efficient and now famous technical institutions, some established by great foresight, but most growing by the slow process of supply and demand.

This country has had its fair share of the spirit of adventure and high endeavour in the past, and if present world conditions have brought us special problems we have no reason to think we shall not surmount them. Without the natural resources of many lands and with a population that can only be maintained by industrial production for export we must prepare to give the world of our best. Trained personnel are no substitute for restless energy, but the able professional man has become a necessary ancillary, and cannot be quickly produced. Among the best investments we can make at the present time is to educate liberally for the future, and with the inevitable bias of a native of this land, I feel certain that not only could we do so, but that many of the initial advantages are with us if we make full use of them. To do this we must face many problems. We must be prepared to attract a due proportion of the nation's talent into the educational field and not let present shortages, and high industrial salaries bleed the present to weaken the future. We must plan methods of inducing men to study essential phases of engineering, which at present, as a result of our temporary economic

difficulties, are on the wane. The numbers involved are small but vital. Very little foregone now may determine for example whether we can add to our national heritage in buildings and public works in ten years time.

Standards of Entry

The foremost lesson to be learnt from America is how much to educate. In the technical field the supreme achievement of America lies in the development of means of training large numbers of ordinary people to become useful technical personnel. And this is done in spite of what appears to be initial disadvantages. The American educational system is designed for the average man. Americans would I think claim it as more democratic than ours, but they have to pay a price. Their college entry is in general one or two years below ours in standard at the same age.

The reasons for this are not far to seek. Our higher educational system has developed into an equality of opportunity rather than an absolute equality of right, and the mere difficulty of gaining entrance to a university has helped to maintain high standards at school. The growth of the English sixth form has had an extremely valuable effect on our educational pattern by introducing into the schools men of serious scholastic attainments whose influence is felt far beyond the senior classes with which they are mainly concerned. While some of us may criticise the over-specialisation which this has sometimes produced, I doubt if in the universities we often realise how great is the debt we owe to the schools, and how much the foundation of clear thinking is laid in advance. Thus, in this country the bright man can earn his way to the university, while the ordinary American can nearly demand it. While our schools divide their classes to suit their men, the average American school has found no need to do so. The arguments are not all one way; to an American our educational system is designed to foster the very man who would, they feel, look after himself, while they concentrate on the average without spoiling the good. But should they not do and can we not do both? If, as I think we should, we step up our higher education, I feel certain we should retain the selective system and grade our courses to the men rather than lower our standards for the sake of uniformity. We no longer educate men

for their individual advantage but because the country needs them. Surely no country has ever achieved greatness on the assumption that all men are mentally equal.

The different standards of entry to American colleges result in their being crowded with first and second year students doing what we do, under more personal supervision and under easier conditions at school. They have found the necessity for great subdivision of classes but seem seldom to have used the opportunity for dividing according to ability. The good men are somewhat held back but America can probably afford to pay the price. In fact the very lack of pressure in the early years may help to produce that enterprise which is so characteristic of the nation.

American Courses

The academic programme of an American university is very different from ours. Subjects (even at school) are divided into units mainly of one semester and credits are granted for successful completion of such courses. The disadvantages of such a system can easily be exaggerated, but to a man bred on the English comprehensive examination system the method does appear to have certain dangers. Credits may easily become something to be accumulated rather than knowledge to be gained. I have no doubt a large proportion of Englishmen take this same attitude to our examinations, be it the school certificate or a university degree, and yet get educated in the process, but the shorter period of digestion seems liable to increase the risk. However the system does make for easy and healthy interchange between institutions, and such moves seem much more common than in Great Britain. Maybe Americans are more trusting than we are. When a man moves they ask for grades ; we, suspecting each other's examinations, set our own. But our method does have the merit of fostering the idea that it is how you think and what you know, rather than the hours you have done, that counts.

Against this I have often heard Americans treat our comprehensive examination system with suspicion as being unnecessarily burdensome on the memory. It is true : the mere inclusion of facts acquired in many terms in one examination would be no good argument for it, even if it did necessitate greater correlation of these facts. But

surely it is the reverse effect that is so noticeable, both on the teacher and the pupil. The memory can be no longer relied on, reason must replace dogma, and the underlying principles must be stressed even though given through an ever increasing maze of technological fact. Moreover the great case for the comprehensive examination is its effect on the student's steady integration of ideas, the constant urge it produces to think about yesterday's work while planning that of tomorrow, for the goal of next year.

What Changes are Needed ?

On general principles of engineering education it is hard to be definite. I can only express my own views as developed by discussion on both sides of the Atlantic. I have asked many people in America and in this country what changes they think should be made in engineering education. The answers are monotonously similar. Greater stress on fundamentals and more attention to clear expression. The first demand raises a difficult question. What does one mean by fundamental ? The number of principles involved in any scientific course for the non-specialist is relatively small. Is there any evidence that the average course that leans to the technical omits any of these principles ? I have been able to find none. But surely the true difference between one course and another lies in the time given to digestion. Too often ideas are strangled by techniques, and the automatic methods of numerical computation stressed at the expense of reasoning on original problems. All the evidence shows that the absorption of fundamental ideas is a time consuming process and that these ideas only become part of the subconscious make-up of a student by great repetition and constant use. But great repetition itself is not an education ; consequently it must be tied in with an attempt to foster mental development. There may be many ways of doing this but one is to make the problems ever more ingenious, if may be as a consequence somewhat impractical. Such theoretical examples leave more room for imaginative twists which, even if they produce shivers in the practical engineer, stimulate the student's mind and, being in general shorter than their practical counterparts, allow the student to spend a greater proportion of his time thinking about and directly applying the principles involved.

In spite of the above I think we can underrate the mental training which can be obtained by the technical application of even empirical rules, provided such courses are not allowed to develop into exercises in the turning of handbook pages or the mere substitution of numbers in formulae. The normal pattern of technological progress is by a steady exterpolation of existing knowledge by many sound men applying trained common sense to what is well-known. Such progress has been produced and can be produced by practical men who combine intelligence with empirical knowledge. What is not fully realized however is that the general course pays out ultimately for the man of average ability and upwards, even in time, let alone in adaptability whatever type of work they finally adopt. First, such a man has the fundamental principles so implanted in his subconscious make-up that he reacts to them automatically in new and unexpected situations. Secondly to a man so matured, a course in technology becomes almost a triviality, if still a necessity. The tricks of the trade have to be known, but while to the one they are obvious once expounded, his technical brother struggles to commit to memory (maybe quite successfully) the techniques of the moment. I am certain the one can learn in a month what the other would do in three and not as effectively. But the sound general man needs time in his early stages. No attention to good teaching and a hundred and one mechanical aids to understanding can replace a slow accumulation of ideas which is made by a man, by himself, for himself. On both sides of the Atlantic there is a danger that the urge for apparent efficiency makes us give men courses, rather than time.

The Americans are not unaware of these dangers but tackle them in a different way from us. They find it convenient to have a relatively uniform system. They pass their scientific courses over more quickly than we do, teach something of techniques, hand a great army of useful men out to industry and then with the selected few (still large in numbers by our standards) continue their training for another two or three years. Many of these men are introduced for the first time to the comprehensive examination (the Ph.D. qualifying examination), and only then obtain the digestion period they require. Whether or not one thinks some gain might be made by reversing the procedure, one must remember that American technical education is a success.

It supplies technical men in sufficient quantity for the industry of the country and, while its early stages are primarily designed for the ordinary man, it produces an abundant supply of first-class products by giving such men the time they require in post-graduate courses.

Clarity of Expression

The second demand of an engineering education was increased clarity of expression. In this, both countries tackle the problem in the same way and, if industrialists are to be believed, with equal lack of success. Universities vary in their requirements; most require reports on experimental work produced in varying degrees of elaboration, but I have never discovered any sign that those schools that demanded the most beautiful and elaborate reports were in any way the less subject to criticism by the users of their products. This suggests that the stereotyped experimental report is not in itself a good training in clarity of expression. Whether the solution is more attention at school to simple writing, or more general studies (discussed later) at the university, or whether such clarity is only achieved by maturity, I do not know; but it certainly cannot be produced before the ability to decide what one wants to say. Perhaps more attention to making précis of scientific articles or writing critical or provocative scientific reports would be better than the existing mechanical filling out of pages under the well-defined headings usual in a laboratory course. At the least it would be worth trying.

Experimental Approach

American success was partly built on a constant questioning of existing methods and a consequent discarding of old ideas. This experimental attitude has or rather is still steadily working its way down the universities. Many such institutions feel that the over-prepared routine experiment is of little value except as a demonstration which can probably be performed more effectively and more quickly by an instructor. Consequently many American universities are changing their line of attack and are instituting quite early on in the curriculum small pieces of independent research, if they can be so called. No great originality is expected and would be out of place, but the work is designed to teach a man to plan, construct, and run

a small test on his own devising. By this means he learns to suspect published data, to confirm handbook rules and to realize that an experimental approach is a sure guide to progress. I think in straight thinking the product of this country's schools can quite hold their own, but when it comes to adapting and trying out new ideas we are too often outstripped.

General Education

Again many American institutions are becoming increasingly aware of the necessity of widely educating their applied scientists and increasing attention is being paid to the humanities. If one is left a little wondering whether courses in literature and history imposed on an otherwise full curriculum necessarily achieve their object, the necessity for trial cannot be denied and many of the courses will doubtless be much modified with time. To combat the difficulty of adding yet further burdens to already heavily loaded courses many universities are introducing a five year curriculum, in some cases on a voluntary basis, in others by compulsion.

I cannot but praise these attempts under the ever-increasing pressure of the modern world to re-establish the importance of a wide education on the art of living. If I have any criticism of the way the scheme works the criticism would apply with equal or greater force in Great Britain. We once again rely overmuch on the schools, as noble as is the work they do, and are overprone to assume that by the time an Englishman comes to a university he has already learnt to use his leisure wisely. It is true the mixed residential university has certain natural advantages but even then, on paper at least, we make a poor showing with the modern America. However we are both losing the thought that education can be gained by freedom, that a book should be read for its own sake, not for tomorrow's "quiz" and jammed in between an hour of solving differential equations and another on problems in thermodynamics. Perhaps it is too much to hope that universities will ever return to being places where one is given time rather than material to study, and leave to follow side issues as inclination leads.

Post-Graduate Education

Finally the importance laid on post-graduate technical education

in America suggests we should do much more to follow their lead. In conceding the necessity for such courses we need not be blind to their disadvantages. Post-graduate technical schools are usually designed to crowd into a few terms specialized design experience which could well be obtained in a longer period while holding a salaried position in industry and they give these specialized courses to students in many cases still uncertain of their ultimate technical destination. There are, anyway, undoubted advantages for a potential engineer, who has received a broad basic training, in his gaining knowledge of modern and specialized techniques alongside practical experience. But this country needs more engineers than enlightened firms are prepared to train. It needs a great number of men to carry modern techniques into backward industries. It needs to help many who, through being smothered in the rush of industrial life, at present fail to consolidate their scientific education. The balance is heavily in favour of the post-graduate technical college, although it does suggest that its students might well be recruited from those with some years industrial experience. Such a method of recruitment has never been considered practical. Nevertheless would not some form of technical " staff college " be worth trying on a limited scale ?

Should the post-graduate technical schools when established be integrated into the general university pattern ? The advantages of mixing future applied scientists with the broader flow of people in a major university are undeniable. But we need more men in the applied fields than can be absorbed by the universities without loss of balance. Moreover, there might be some advantage, in spite of American practice, in divorcing such schools from their undergraduate counterparts, since an atmosphere ideal to the one may be ill-suited to the other. The case for separation is strengthened by the necessity for large numbers since the universities can be better employed to the maximum of their capacity in giving a wide, balanced and fundamental training to their members and in concentrating in their post-graduate work on the more fundamental scientific research.

The universities would thus hand on many men after graduation to separate technical colleges. These colleges should be avowedly technical. They should be largely staffed with men who would maintain constant consulting contact with industry and who in

many cases would be more interested in industrial development work rather than in fundamental research. Such development work requires a mental level no lower than that required by most pure research and engenders an attitude of mind of great value to the future practising engineer. It is not of course suggested that the technical colleges should ignore fundamental work either in teaching or research but only that they should be entitled to assume that their students had already digested their basic scientific principles. It will be clear that such schools would only be a success if they were teaching the techniques of to-day and preparing for the techniques of tomorrow. They would need a staff of enormous enthusiasm who would carry the strain of two worlds, the academic and the industrial. Such members should be encouraged as in America to co-operate with industry and should be expected to earn thereby fees comparable with general industrial consultants.

In closing I would again stress that technical development is an ancillary not the cause of industrial success. We in Great Britain must and can experiment on a large scale; but to experiment means to learn from failures and not only to take roads to mediocre success. If we, the educators, try to instil the spirit of enterprise in the coming generation of engineers, it must be partly to support their future as great adventurers rather than as skilled but detailed technologists. It may be easier to take risks when wealthy, but it is even more necessary to do so when, without risk, no success is possible.

LESSONS FROM AMERICAN METHODS

By Sir Ewart Smith

Technical Director of Imperial Chemical Industries Ltd., and Member of the Advisory Council on Scientific Policy.

The following note is based on a Report by Sir Ewart Smith on his U.S.A. tour from April 26th to May 24th, 1947:—

Educational Standards

The normal length of course at American universities for a student taking Engineering or Chemistry is four years for a Bachelor's degree, five years for a Master's, and six to seven years for a Doctor's degree. It must be realised, however, that the starting standard is lower than in Britain, being normally little higher than our matriculation level, and most of the first year's syllabus would be covered at a British school.

The type of training naturally varies considerably between institutions. At the best of them, such as Massachusetts Institute of Technology, every effort is made to teach the student to think and to inculcate a fundamental approach, the training corresponding closely with that at the better British institutions. At other centres, the training is very much more superficial and consists largely of descriptive and experimental work on specific processes and machines.

The engineering student in the United States devotes more of his time at college to practical work. This applies both to workshop's practice and to the testing of machines and prime movers, etc. The laboratory equipment in the better institutions is extremely modern and, at Massachusetts Institute of Technology for example, undergraduate students in the aeronautical section will shortly be trained in the operation and testing of such equipment as supersonic wind tunnels and gas turbines. The question of the practical training of engineers in industrial shops will be dealt with under a separate heading.

A point worth noting is the high proportion of teaching staff relative to the number of students at American universities. In 1942, these amounted to 134,000 (reduced to a full-time basis) on a total number of students of 637,000. Furthermore, the interchange and

contacts between teaching staff and industry appears to be very good and a large proportion of the former have had industrial experience. This avoids the somewhat insular and academic outlook so often found in British educational establishments. Every effort should be made here to get more and better university teachers and to give those responsible for higher technical education an appropriate industrial background.

Output of Engineering Graduates

In 1939, the annual output of engineering graduates from American universities was approximately 14,000, whereas the corresponding figure for Great Britain was only 743. Great efforts have been made during the war to increase the output of engineering graduates in this country, and the corresponding figure for 1946 was 1,138. On the other hand, the American output is believed to have risen to about 17-18,000. It will be seen, therefore, that in the United States they are now turning out approximately one engineer for every 8,000 of the population, whereas in this country, we only produce one engineer to every 40,000.

The plentiful supply of qualified engineers means that in the United States they are often employed in large numbers in the drawing office, as foremen and, in some cases, even on the floor of the shop. This results in a considerable improvement in technique particularly with regard to detail design and manufacture.

Recruitment of Engineers into Industry

In the Chemical industry engineering posts are filled almost exclusively by college graduates. Most of these are absorbed directly into positions on the senior staff, although a few may spend some time in the drawing office. There is virtually no recruitment to engineering posts of men with purely practical experience from the workshop's side. In the straight engineering firms a very small proportion of practical men reach senior positions, but the majority are college graduates.

A point worth noting is the high starting salary of the man with a D.Sc. degree relative to the man with only a B.Sc. degree. The man with a B.Sc. may start with a salary which is only sixty per cent.

of the starting salary of the D.Sc. It is unlikely that a man joining the firm with a B.Sc. would have risen in two to three years to the starting salary of the higher grade man, and there is, therefore, every incentive for a man to spend this period in carrying out post-graduate work at a university.

Post-Graduate Training

Opinion in the chemical firms which I visited was almost unanimous that it was a waste of time for a graduate engineer to carry out any form of practical apprenticeship, working on the floor of the shop on equal terms with the craftsman. The advantages claimed for the system in Britain are :—

(*a*) It gives the student apprentice a first-hand knowledge of engineering processes and puts him in touch with reality.

(*b*) He meets the workers on an equal footing, and becomes familiar with their outlook.

(*c*) It provides him with his only opportunity of seeing management from below.

Argument (*a*) does not apply with equal force in the United States as more time is devoted at college to practical training, and many students spend part of their vacations in industrial workshops. It is also argued that an engineer never has to operate a machine tool so why should he waste time learning ? The reply to argument (*b*) is that the difference in outlook between the junior engineer and the craftsman is probably less marked in the United States than in Britain, mainly due to the fact that the standard of living of the latter is relatively much higher and the two are more likely to meet socially. The validity of argument (*c*) is generally admitted : but it is felt that by itself it does not justify the time spent on an apprenticeship.

Among the engineering firms visited, a few admitted the desirability of post-graduate practical training, although none was carrying out such a scheme as a general policy.

While little enthusiasm was shown for practical training, all the firms visited were keenly aware of the necessity for the continuation of other forms of training after a graduate engineer has joined an industrial concern. Members of one large industrial company stated that, for the first ten years of an engineer's industrial career,

up to 25% of his time should be devoted to direct and indirect training. This takes the form of organised lectures, of time set aside for the reading of periodicals, for visits and for seminars, etc.

Massachusetts Institute of Technology

The leading position which the M.I.T. holds in the American field of technical education is well known, but it is difficult to appreciate the size and scope of its teaching staff and of its laboratory facilities without an actual visit to the Institute. There is no doubt that a serious need exists in this country for comparable Foundations.

A very large amount of post-graduate research is carried out, and the Institute willingly accepts post-graduate students from overseas. It would be well worth while for some firms in this country to send selected staff to work there for a period as part of their post-graduate training. In view of the need for improving the quality and increasing the numbers of the country's engineering and chemical engineering staff, such a policy would be very rewarding. The period spent with M.I.T. would not only enable these men to carry out specific research and increase their academic knowledge, but would also give them an opportunity of visiting suitable industrial firms and of gaining a first-hand insight into American engineering techniques in the wider sense.

It is interesting to note that all students now have to take English and, in addition, a language or some other subject under the " Humanitas " heading.

REVIEWS

SCHOLARSHIP FOR CANADA: THE FUNCTION OF GRADUATE STUDIES. *By* JOHN BARTLETT BREBNER. (*Canadian Social Science Research Council, Ottawa.* pp. 90. 1945).

THE HUMANITIES IN CANADA. *By* WATSON KIRKCONNELL and A. S. P. WOODHOUSE. (*Humanities Research Council of Canada. Ottawa.* pp. 287. 1947).

A BRIEF GUIDE TO AUSTRALIAN UNIVERSITIES. (*Published for the Australian Council for Educational Research. Melbourne University Press.* pp. 29. 1947).

THE UNIVERSITY AND THE COMMUNITY: ESSAYS IN HONOUR OF THOMAS HENRY HUNTER. (*Victoria University College, Wellington, New Zealand.* pp. 302. 1946).

The story is told of an Australian university teacher who came for the first time to Oxford. " What is the main difference " he asked, " between Oxford and our universities ? " " The main difference " was the reply, " is that in Oxford such a question as that would never be asked."

There is a great deal of truth in that story. Dominion universities still look deferentially toward British universities. They are indeed the offspring of British universities, but they do not show the healthy disregard of their parents which is a sign of youthful maturity. They approach many of their problems by asking first " What would Mother have done ? ". This is so even of their architecture: that is why there are monastic cloisters and gargoyles and fretted windows under the Australian sun: not Redbrick, but Dominion Gothic. But one parental trait of the older universities has not been inherited by their Dominion offspring—the trait of complacency. Dominion universities are not complacent, and the books now under review are a witness to this. The difficulty is that (quite naturally) they themselves are not their best critics.

It is a pleasure, therefore, to read a book about Canadian universities by an academic man from an American university. In 1945 Dr. Brebner, with the financial help of the Rockefeller Foundation, was relieved of some of his responsibilities at Columbia, to write an essay on scholarship in Canada. Much of what he says about Canadian universities is valid for other universities in the British Empire, and most of what he says is sound doctrine. He writes well, and he comes to Canadian universities, not from the autumnal glow of an Oxford college, but from the hard, bright light of a monstrous and flourishing American urban university. He finds Canadian universities understaffed, underfinanced, and undernourished with books, compared to American universities. He hints that there are Boards of Trustees who treat the university as though it were an insurance company,

and the professors as though they were accountants, in Canada as elsewhere. He thinks that a Canadian university president is driven by the circumstances of his position to become (in Patrick Geddes' words) "a great head-janitor, perfected in his low-level efficiency." Altogether, Brebner finds that conditions for scholarship in Canada are less congenial than in other parts of the world. The major theme of his essay is that Canada should take steps to keep her intellectual élite, and not any longer take pride (as Scotland has for centuries) in the fact that she exports brains.

The book by Kirkconnell and Woodhouse is a rather cumbersome variation on Dr. Brebner's theme. It contains minutiae about the place of Arts subjects in Canadian scholarship. In the tradition of American social surveys, it provides numerical data of student enrolments, books in libraries, percentage of Arts professors with foreign "contacts," teaching loads of Arts lecturers, salaries, endowments, and the number of Fellows of the Royal Society of Canada who read to the Society 0, 1, 2, 3, etc., papers a year. (Mathematicians will be amused to know that the figures in this last table fall approximately on a Poisson distribution). All this makes inevitably for rather heavy reading, but the data are interesting. These two Canadians reach the same general conclusion as Brebner reached: "Canada may have ranked as the fourth nation in the world in terms of wartime trade, but even little European nations like Denmark with a quarter of our population and less than one per cent of our territory, completely eclipse us in the matter of scholarship." This conclusion, too, can be applied to Australia and New Zealand.

The brief guide to Australian universities is a pamphlet which will be very useful to students or academic men who consider going to work in Australia. It contains information as to the structure, organisation, fees, living costs, etc., for the seven Australian universities. There are tables which show the size of staff and the numbers of students, and which emphasise the chronic understaffing in Australian universities. In 1945-46, when the universities had a little more than half their present student population, the ratio of staff to students was about one to twenty-five, as compared with the one to nine for a typical British civic university. The pamphlet does not mention academic salaries which are, relative to the present cost of living, higher than academic salaries in Canada, or even in the United Kingdom. The pamphlet contains two facts which are often forgotten in Britain: the first, that universities began in Australia in 1850, when there were only four universities in England; and the second, that (despite the difficulties which Australian universities have to face) the "average standard of attainment" of Australian students is high.

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Universities in Australia have the same paramount question to answer as Canadian universities have: How can the best scholars (all of whom have the opportunity these days to study abroad) be persuaded to return to their native land? There is a lot to be said for a healthy trade in brains, provided the balance of trade is not adverse to the Dominions; and it is approximately true that for every Australian scholar who remains in England, a British scholar emigrates to Australia. Greek scholars, like Badham, and lawyers, like Pitt-Cobbett, were able to do first-class work in Sydney, even before the age of air mail and photostat manuscripts. Yet there is no denying that the eyes of too many Australian scholars are turned toward Europe, and too many of them are willing to forego sunshine and steak and citrus fruits for the intellectual climate of England. Until this nostalgia is cured, Australian scholarship will remain at a disadvantage.

The last of these four books is a series of essays in honour of the Vice-Chancellor of the University of New Zealand, on his seventieth birthday. New Zealand scholarship owes a debt to Sir Thomas Hunter which is too great to be assessed. These essays (which are excellently printed and are a credit to New Zealand book production), are at least a token payment of that debt.

The essays include two personal memoirs, and articles on psychology, history, law, biology, geology, etc. in New Zealand. Such a collection is, of course, uneven in quality. There is a sincere and charming life of Hunter; and some reminiscences of him in which variety, if not illumination, is provided by copious quotations in Latin, Greek, French, and German. The brightest essay is one on university administration by Professor I. A. Gordon. Gordon, with delightful asperity, discloses the committee-ridden life which a Dominion professor leads. He explains how even a change in a set book has to be approved by the professors in all the University Colleges, then has to pass numerous committees, and ultimately has to receive the consent of the Governor General in Council, before it can be inserted in the Calendar. It is a slight, but only slight exaggeration; and for the man working under this system, it doesn't feel like an exaggeration at all. The University of New Zealand is an examining body, which (until German submarines prevented it in 1940) used to send all its scripts to England for correction. The colleges are loosely affiliated to the University, but retain some independence. Yet they are all bound by the same syllabus. It is a chaotic situation, which has not been resolved by a melancholy series of enquiries and Royal Commissions.

These are, however, the growing pains of scholarship in a young country which has so far succeeded very well without scholars. As

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the lights go out in Europe, one feels the future scholarship may lie in these happy climates; for scholars need some isolation and some quiet. One lack above all others impedes the progress of scholarship in the Dominions: it is the lack of a conviction on the part of the public that scholarship is necessary. British universities know that their public, even the non-academic public, is sympathetic to scholarship. Dominion universities know that their public is not sympathetic. When the Dominion farmer is as keen on education as the Scots crofter, the Dominion Gothic university will come into its own.

ERIC ASHBY.

ARTHUR QUILLER-COUCH—A BIOGRAPHICAL STUDY OF 'Q,' *By* F. BRITTAIN. (*Cambridge University Press*, 15*s*.)

The passing of 'Q' would have attracted more attention if it had not happened in May 1944, when England was on tip-toe with effort and expectation and desire. But even as it was, we in Cambridge, when we heard of his death, felt that brightness had fallen from the air. The sense of loss recalled a strange thing he had once told me: that one year, suddenly and unaccountably, all the musk flowers—not only in Cornwall, but throughout the land—had lost their scent. So it was when 'Q' died; with his departure, life and work lost a fragrance, a distinction, which we had long taken for granted. Nothing with which 'Q' had to do could ever be quite ordinary; that touch of grace, and ceremony, and courtesy, which distinguished all that he said and did, had been communicated to the very idea of the English School, and was intermingled even with the commonplaces of its routine. With 'Q' passed an era as well as a man—we may call it the age of his own 'Royal Saint.' 'Q's' world indeed, had died before him, and for his own sake we cannot wish that he had been stretched out longer upon the rack of this rougher one. He was a link with a past that was richer, warmer, more tender, picturesque and sentimental than our own, and we shall not look upon his or its like again. But in the pages of this charming biography he lives once more, and we are truly grateful to Mr. Brittain for having painted so faithful and loving a portrait.

'Q' and his world may have passed away, but his Cornish Renée Andrée still flowers on the wall of Jesus College, and the tradition he implanted still flourishes in Cambridge and far beyond it. When the King Edward VII Chair of English Literature was founded, McTaggart said that a Professorship of 'such a subject' would 'not only be useless but positively pernicious to the University.' 'Q' had to live down much prejudice of this kind, and it may be that (in spite of the universal affection he soon won) his incurably unacademic ways, and his undisguised contempt for pedantry, postponed the recognition

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of English in Cambridge as an academically respectable subject. But then the very core of his message was an impassioned though humorous protest against academic 'respectability,' if by that he meant treating literature as a 'subject' or set of facts to be 'got up' in the dry-as-dust style.

Literature, he insisted, cannot be divorced from life; it contains the life-blood of master spirits, and we should read it, not so much to become learned, as to have life and have it more abundantly. To him above all, and to his original helpers Stewart and Chadwick, and his later colleagues Forbes, Tillyard and others, we owe it that the Cambridge English School has become (as we hope) a place of liberal education where the young can be trained in the difficult arts of Reading and Writing, and where, in this age of one-sided specialisation, the humane values may be upheld. Never before has 'English' been faced with so tremendous a task—that, namely, of shouldering the main burden of the Humanities in our new age. We shall best honour 'Q's' memory by putting first things first; not undervaluing scholarship but keeping it alive; continuing his quest for the best that has been thought and said, and his fight against all that, in these latter days, threatens the full perfection of our humanity.

In this book we have 'Q' himself, his very form and pressure. Perhaps the strongest impression Mr. Brittain's portrait leaves with us is that of the finished perfection of all 'Q's' words and deeds—and what a multitude of these there were, after all! If sometimes we in this University were a trifle jealous of the claims of Fowey, we knew all the while (and Mr. Brittain well reminds us) that if 'Q' had not been King of Troy he would not have been 'Q' at all. He may have divided his energies too much, and sat too lightly on 'Arthur's Seat.' But it was enough to know that he reigned, for there was a daily beauty in his life, and *nihil quod tetigit non ornavit*.

BASIL WILLEY.

SCIENTIST IN RUSSIA. *By* ERIC ASHBY. (*Penguin Books*. pp. 252. 1*s*. 1947).

Professor Ashby spent most of 1945 as Counsellor of the Australian Legation in Moscow. His special task was to study Soviet science and develop contacts with Soviet scientists, and the wealth of information packed into *Scientist in Russia* is a measure of the success of his endeavours. The jubilee celebration of the 220th anniversary of the Academy of Sciences undoubtedly helped him by throwing open doors which it might well have needed weeks or months of tedious frustrating effort to unbar had he been limited to working through the Society for Cultural Relations with Foreign Countries which

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treated them to " very little beside obstruction, inefficiency and evasion." (P.13). He also took the rewarding precaution of supplementing personal contacts by careful study of the daily, periodical and learned press. This contributed to a better perspective and has helped him to enrich his book with revealing extracts from newspapers and with translations and summaries of school courses, syllabuses, etc. It has also enabled him to add six appendices of useful information about various aspects of Soviet education and research.

The book opens with a short introductory chapter on the depressing theme of the difficulties usually encountered by curious foreigners anxious for access to Soviet institutions and schools. In Chapter 2 Professor Ashby describes the organisation of Soviet science, particularly the structure and membership of the Academy of Sciences, and maintains that in his own experience " co-ordination of scientific effort is not much more evident in Russia than in Britain " in spite of the existence of a planned economy. (P. 17). Chapters 3 and 4 deal with school and college education and sketch the general educational background of future Soviet scientists. Chapter 5, which is the real heart of the book, discusses the influence of dialectical materialism on scientific research, mainly in the light of Krenke's researches on plant development and Lysenko's work on genetics. Professor Ashby argues that Krenke's work is " a legitimate and profitable use of dialectics in science," that Lysenko's " is an exploitation of dialectics in science for political ends " and that " the bulk of his opinions on genetics may be dismissed as the produce of a medieval mind using what is almost a medieval technique." (P. 117). His general view is " that the bulk of Soviet science shows no signs of having been influenced by Marxian philosophy at all ", (P.99) a surprising impression which he may have been helped to gain through not establishing contact with Soviet scientists until the exigencies of war had temporarily pushed Marxism-Leninism into the background. But in the last two years the Communist leaders have been waging a vigorous ideological campaign in all spheres of Soviet activity, and it will certainly not be the fault of Mr. Zhadanov and his henchmen if Soviet science continues to be " carried out by western methods " and in conformity with " western standards of criticism." The new press attack on Zhebrak for example is an unmistakable sign of the changed time.

The three remaining chapters of the book vividly describe the jubilee celebration of the 220th anniversary of the Academy of Sciences, a train trip to Murmansk and back, and the generous publicity given to Soviet science by the press and propaganda services, including the sustained attempt to foster national pride by claiming

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that many important scientific discoveries previously attributed to foreigners really originated in Russia. In five important pages at the end Professor Ashby sums up his general impressions of Soviet scientists, which are distinctly favourable, though he maintains that there is a much greater dilution of first-class men by men of poorer quality than elsewhere and categorically denies that planning is responsible for the achievements of Soviet science. "These," he says, "are due to the brilliance of Soviet scientists not to their organisation." (P. 204). The tragedy is that the prospects of establishing and developing contacts between these Soviet scientists and their western colleagues appear to be growing gloomier every day.

G. H. BOLSOVER.

CITIZENSHIP IN THE EDUCATION OF TEACHERS. (*Oxford University Press.* 1948).

Those who attended the early conferences on education for citizenship but have not recently been in close touch with the movement will be delighted and perhaps a little astonished to discover the change of attitude embodied in this book. It is no longer assumed that the main task is to teach "straight thinking" or even to inculcate "right values." Of course, it *does* need training and experience to think straight, especially on subjects that touch closely our personal interests and prejudices. But there is the awkward problem of the transference of training, and it is now rightly recognised that the only sure way is to train in the kind of material in which judgment must be used later. Again, democracy must *assume* certain values, and had better do so openly. There is, further, a welcome stress on a study of the actual society and its institutions which must form the basis of the future teacher's work in school. In short, the approach is now much more realistic—less concerned with abstract principles, however valid and important, more closely related to the actual world, with its conflicts and compromises, and even—it is admitted—some inevitable bias.

It is wisely accepted that there is no one royal road to success. Converging lines of effort are most likely to give the results aimed at. There must be direct teaching of economics, ethics and politics. Some form of survey or at least of social observation should be included. A course in social study should form a part of the curriculum. But all this will fail if the community in which the training is given is not itself a living experiment in democracy, the students taking whatever is their appropriate share in shaping the common life and determining its standards. Welcome, too, is the assertion that emotional, as well as intellectual maturity is necessary for effective citizenship, and the warning that college life can be *too*

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Lecturer in Mathematics, Borough Road College, Isleworth, Middlesex.

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sheltered, too " inward-looking," too unwilling to risk the disturbance which wider contacts must bring.

There are valuable examples of syllabuses actually in use in universities and colleges, which have definite courses in social study, and further syllabuses for the teaching of certain academic subjects so as to bring out their social reference.

There is a wealth of material in this short book which it is hoped will stimulate discussion and further experiment. Indeed, one feels at times rather like the diner-out who, confined by regulation to one main dish and two subsidiaries, is at a loss how to choose—for, even if the course is lengthened (as the authors recommend) a training college must cover a wide field, while a university department of education will still, presumably, be limited to one year. Somehow, one must establish priorities. It is, however, right that a " pressure group " should stake a broad claim, in the hope that at least the main points in its programme will be conceded.

J. H. NICHOLSON.

HUMANITAS. Volume 2, Number 1. Autumn, 1947.

The articles and reviews with which this journal begins its second year prove the remarkable enterprise and high seriousness of the group of Manchester students who initiated it. The editors (who now include members of the University staff), in their attempt " to foster among members of the universities an awareness of their peculiar responsibilities," deserve the support of " all those who regard the fate of our civilization as their moral concern ". The journal is " engaged on a quest," and its readers will find much to stimulate their thinking even though they may suspect the quest is leading in a direction in which they do not choose to go. They will find Professor von Weiszäcker conceding that " The Spirit of Natural Science " does not spring from the Devil, but maintaining that man " must not " be merely " a casually explainable object "—he has feelings and emotions and different kinds of experience. In Professor Emmet's clear and fair-minded " Reflections on Logical Positivism," some readers will find protection from natural science, while others will stress the need she points out for the empirical study of convictions, valuations, general ideas and the use of language.

R. A. C. OLIVER.

NOTE

We regret that W. B. Gallie's signature was omitted from the review of "Essays in Science and Philosophy."

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